Attachment 9

ECBC Quality Control Plan for CASARM

MONITORING BRANCH
QUALITY CONTROL PLAN
FOR CHEMICAL AGENT STANDARD ANALYTICAL REFERENCE MATERIAL
(CASARM)

REVISION NO. 7

COPY NUMBER _____

U.S. ARMY
EDGEWOOD CHEMICAL BIOLOGICAL CENTER
CB SERVICES DIRECTORATE
APPLICATIONS DIVISION

Record of Change

Previous revisions of this document did not incorporate a record of change page.
The following changes are included in Revision 7.
LIMS information incorporated into plan.
Correction of problems/comments surfaced as a result of CASARM Audits in 2001 & 2002
Added Monitoring Responsibilities for "Off Site" Remediation Activities.
Correction of syntax and grammar.
Changes resulting from incorporation of new Procedures, Internal & External Audits and Improvements/Suggestions by Monitoring Branch Personnel
Incorporation of changes required by the revised CASARM QA Plan (Rev#4)
IOP MT-13 WAS SPLIT INTO SEPARATE IOP's FOR MASS SPEC AND GC.
IOP-MT-13—GC/MSD PROCEDURES
IOP-MT-19—GC/FPD PROCEDURES (NEW)
Changed figure 1 to include Calibration Coordinator & FTIR Team.
Table 2 changed to reflect correct airflow/concentrations.
Added Table 4.
Added additional requirement for each team to "read and initial IOP's" as required
Paragraph 4.8.8.2—Changed V-G pad requirement to See appropriate IOP and deleted all after "operating protocols" in last paragraph.
Incorporated FTIR information.
Additional details and IOPs added in response to CASARM comments dated 8/20/2003

LIMS: LABORATORY MANAGEMENT INFORMATION SYSTEM AS USED IN THIS DOCUMENT INCLUDES THE "TAG PROGRAM," "HORIZON," & OTHER SOFTWARE/HARDWARE USED TO MANAGE LABORATORY INFORMATION. REFERENCES TO SPECIFIC PROGRAMS SUCH AS "TAG PROGRAM" HAVE BEEN DELETED (EXCEPT FOR FIELD OPERATIONS) SINCE IT IS INCLUDED IN "LIMS."

Approved by:

/S/ Thomas Rosso_____ 1/13/2004_
Chief, Monitoring Branch Date

CONTENTS

0.0 INTRODUCTION

The Monitoring Branch operates as part of the CB Services Directorate, of the U.S. Army Edgewood Chemical Biological Center. Agent monitoring systems are used in conjunction with a variety of engineering and laboratory systems to provide control over agent storage and work site activity. The Monitoring Branch's main objective is to quantitatively determine the presence of chemical agent vapor contamination in the ambient air, at sites where chemical agents are used and/or stored, or at remediation sites. The objectives of chemical agent monitoring are to ensure the protection of workers, the public, and the environment. The Monitoring Branch also provides documentation on the containment of chemical agents to meet regulatory requirements. The hazard level of interest is the Airborne Exposure Limit (AEL). (The abbreviation AEL is used throughout this document to replace the HL or Z abbreviation normally used for the term hazard level.) The AEL is the exposure limit established by the U.S. Army CHPPM.[1]

To accomplish the stated objective, the Monitoring Branch uses Depot Area Air Monitoring Systems (DAAMS) technology. The DAAMS technology collects a sample onto a tube containing a solid-sorbent material. An air sample is drawn through a tube for a specified period of time at a known flow rate. The agent is collected on the solid sorbent and is subsequently analyzed by the thermal desorption of the sample into a gas chromatograph (GC) equipped with various detectors, such as: a Flame Photometric Detector (FPD), an Electron Capture Detector (ECD), or a Mass Selective Detector (MSD). Any positive readings are confirmed using a GC/MSD or a GC fitted with a column having separation characteristics, which differ from the characteristics of the first column.

An additional technology used to support the Monitoring Branch objective is the Miniature Continuous Air Monitoring System (MINICAMS) that monitors both mobile and fixed sites. This system collects a sample through a heated sample line onto a sorbent material or in a sample loop. During the analysis cycle, the sorbent material is heated and then the sample is desorbed onto a column where sample components are separated chromatographically. Each component is detected by an FPD or Halogen Specific Detector (XSD), where an analog to digital response is recorded and reported as an AEL value for the compound of interest.

The Monitoring Branch uses FTIR (open path and extractive cell), a continuous air monitoring system, to analyze air samples by examining a vapor's infrared absorbance features. The OPFTIR can detect over 200 different vapor phase compounds, including Chemical Warfare Materials. Unlike a point sampler, the FTIR measures an average concentration over a given pathlength (up to 400 m, depending upon atmospheric conditions). Pre-selected compounds are analyzed within 5 minutes or less. In addition, these 5-minute increments of the infrared

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[1] Army Regulation 385-61. Army Toxic Chemical Safety Program

2. The term "Time Weighted Average (TWA) and Airborne Exposure Limit (AEL) " will be used interchangeably in this document unless otherwise specified.
TWA is used to be consistent with the MINICAMS software.

spectrum (500 to 4500 cm $^{-1}$) are stored on computer disk allowing for later identification and quantification of other compounds of interest.

1.0 SCOPE AND FIELD OF APPLICATION

1.1 Scope

This Quality Control (QC) Plan specifies the Monitoring Branch's requirements for compliance with the International Organization for Standardization (ISO) Standard 9001-2000 and the CASARM Quality Assurance (QA) Plan for Chemical Agent Air Monitoring (CQAPCAAM).

Note: Section 7.3 of ANSI/ISO/ASQ Q9001-2000 does not apply to Monitoring Branch.

1.2 Field of Application

This plan describes the actions required to provide quality controls over the operations performed in accomplishing the assigned Monitoring Branch mission. The operations include: real time monitoring, sample collection, preservation, analysis, data reduction, and reporting. As defined by CASARM QA Plan (Rev.4), Real Time Monitors (RTM) include GCs with thermal desorption monitoring system and MINICAMS.

2.0 REFERENCES

ISO 9001-2000 QUALITY MANAGEMENT SYSTEMS

CASARM QA Plan for Chemical Agent Air Monitoring, Revision No. 4

Army Regulation (AR) 385-61 Army Toxic Chemical Safety Program

Internal Operating Procedures (IOP) for the Monitoring Branch

Standard Operating Procedures (SOP) for the Monitoring Branch

3.0 DEFINITIONS

Definitions given in the ISO 9001 - 2000 standard and the CQAPCAAM are applicable to the Monitoring Branch QC Plan. Selected definitions from the CQAPCAAM and terms used with the Monitoring Branch are provided below.

ACCREDITATION – Formal recognition that an organization is competent to carry out specific tests or specific types of tests.

AIR SAMPLES WORKORDER (MBFORM-39) - A form used to record all DAAMS air method sampling information in the form required for entry into the LIMS. This record contains the sampling times and flow rates for each DAAMS tube sample.

AIRBORNE EXPOSURE LIMIT (AEL) – An exposure concentration limit for substance in air, based on an evaluation of health effects data. The limit must be further specified, for example, acute or long-term, worker or general population.

ANALYTE – The substance that one is interested in detecting and/or quantifying during chemical analysis of a sample.

CERTIFICATION OF CONFORMITY – Action by a third party demonstrating that adequate confidence is provided that a duly identified product, process, or service conforms to a specific standard or other normative document.

CHEMICAL AGENT STANDARD ANALYTICAL REFERENCE MATERIAL (CASARM) – Chemical Surety Material (CSM) or dilute solutions of CSM used for research, development, testing, and evaluation (RDT&E) whose purity or concentration has been accurately determined, which is stored in a manner that minimizes degradation, and whose concentration or purity is periodically confirmed.

CONFIDENCE LIMITS (OR BOUNDS) – The upper and lower bounds of an interval of values within which the probability that an assertion about the value of a population parameter is correct with a pre-assigned level of confidence.

CONFIDENCE (OR SIGNIFICANCE) LEVEL – A value corresponding to the probability that single future measurement will yield a particular result or fall within a particular interval of values.

CONFIRMATION – A second method of detection used to provide verification of the presence of agent detected by the monitoring system. A method/monitor utilizing a different analytical method from the primary analytical method shall be used to confirm the presence of agent. The factor that distinguishes one GC-based method from another is the stationary phase employed. Some methods, such as DAAMS, require duplicate samples to allow confirmation.

CONTROL PARAMETER – A parameter whose value depends on the bias and/or precision of a method and whose value is used in a control charting procedure to maintain daily control of method bias and/or precision.

CUSTOMER – The recipient of a product provided by the organization.

DAILY REPORT (MBFORM-5, MBFORM-52) – A form used by the analyst to write the analytical results and/or comments for each field and QC sample.

DATA SHEET (MBFORM-11, MBFORM-44) - A computer generated printout containing pertinent sample results and clearance information.

DETECTION LIMIT – A population parameter that for future measurements predicts the lowest target concentration that can be detected at least 97.5% of the time. The detection limit is the value of the target concentration whose lowest prediction bound occurs at the same found concentration as the upper prediction bound for a blank sample.

FIELD LABEL - A hand written label containing sample information that will be entered into a computer-based Laboratory Information Management System (LIMS).

FOUND ACTION LEVEL (FAL) – A population parameter that for future measurements predicts the highest found concentration at which there is a 97.5% level of confidence that the target concentration is less than the hazard level.

GENERAL POPULATION LIMIT (GPL) – The allowable time-weighted-average agent exposure limit established for the general public for a 72-hour period.

LIMS – Laboratory Information Management System.

LOWEST CONCENTRATION STANDARD (LCS)—The lowest target concentration analyzed during the precision and accuracy study whose concentration is closest to but greater that the detection limit. (Note: In earlier editions of the CASARM Plan, LCS was referred to as the Certified Reporting Limit (CRL).

LOW LEVEL CHALLENGE (LLC)--A Quality Control sample to challenge monitoring equipment that is $\geq$ 0.3Z for all hazard levels.

METHOD – A process in which a sample is collected at a sampling site and is subsequently transported to a laboratory where it is handled properly and analyzed by an appropriate technique. Method requirements specify the type of sampling media, airflow rates, collection time, the details of sample preparation, and the type and set-points of the instrument that will be used to analyze the sample.

METHOD BIAS – A systematic error inherent in a method or caused by some artifact or idiosyncrasy of the measurement system.

METHOD OR MEASUREMENT ACCURACY – The degree of agreement of a measured value with the true or expected value of the quantity of concern. Method accuracy depends on both the bias and precision of the method.

METHOD OR MEASUREMENT INACCURACY – The magnitude of the deviation of a single measurement result from the corresponding true value.

MONITOR – An instrument that samples a specific volume of air at a sampling site and performs a real-time analysis of the sample. Some monitors provide a visual and/or written record of the concentration of the agent of interest, as well as an audible alarm if the level of agent is at or above the alarm point.

PERSONNEL ROSTER (MBFORM-42) - This form is used to record the personnel entering a building room or other designated exclusion areas during the monitoring of a Standing Operating Procedure (SOP). Information on this form includes the building and room number, the SOP number and the agent being used. Personnel entering the room during SOP operations are to sign in, write their social security number and their level of protective clothing. This information is entered into a 40-year database maintained by the Monitoring Branch.

PRECISION – The degree of mutual agreement characteristic of independent measurements as the result of repeated application of the process under specified conditions.

PRODUCT – The result of activities or processes. A product may include service, hardware, processed materials, software, or a combination thereof. A product can be tangible or intangible or a combination thereof. Products, for organizations that fall under this QA Plan, are analytical data and samples.

QUALITY ASSURANCE (QA) – The total integrated program for assuring and documenting the reliability of monitoring and measurement data and for integrating quality planning, quality assessment, and quality improvement efforts to meet user requirements.

QUALITY CONTROL (QC) – The routine application of procedures for obtaining prescribed standard of performance in the monitoring and measurement process.

QUALITY CONTROL (QC) SAMPLES – Synthetically prepared samples that allow the laboratories to prove that the monitoring system is operating as designed and is capable of detecting and quantifying chemical agent at the required concentrations.

QUALITY-LABORATORY SAMPLE (QL) – A quality control sample that has been spiked with a solution of dilute chemical agent and aspirated to evaporate any residual solvent and subsequently analyzed in the laboratory.

QUALITY PROCESS SAMPLE (QP) – A quality control sample that has been spiked with a dilute chemical agent and exposed to ambient air for the same time and at the same flow rate as ordinary samples. QPs are used to estimate percent recovery of the agent in a given volume of air.

QUALITY SYSTEM – The organizational structure, responsibilities, procedures, and resources for implementation of quality management.

RANDOM ERROR – A component of total error that is not assignable to any specific source and the magnitude of which can be predicted only in terms of probability.

REAL TIME MONITORING (RTM) – The ultimate goal of chemical agent detector technology is to provide instantaneous identification of AEL concentrations in the air. For the purposes of this document, real time is defined as a period of 15 minutes or less.

SAMPLE LABEL - An official label generated from the LIMS containing information obtained in the field as well as point of contact information for each sample.

SCRATCH LOG (MBFORM-12), (MBFORM-45) - A computer generated printout containing pertinent sample information and a chain-of-custody, which is used to track a sample.

SYSTEMATIC ERROR – The amount by which the mean of the distribution of measurements differs from the true or target value measured. The error may be either dependent on, or invariant with respect to, analyte concentration.

TARGET ACTION LEVEL (TAL) – A population parameter that for future measurements predicts the highest target concentration that can be distinguished as lower than the hazard level 97.5% of the time when using a test whose probability of a false-positive response is 0.025 (or 2.5%).

TIME-WEIGHTED AVERAGE (TWA) – The allowable unmasked-worker exposure limit established by the U.S. Army for an 8-hour-per-day exposure over a maximum of five consecutive work periods for an indefinite time. (Low-level safety standard used in monitoring)

TYPE 1 METHOD OR MONITOR – A fully quantitative analytical method or monitor that yields a numerical estimate of the analyte concentration within a working concentration range.

TYPE 2 METHOD OR MONITOR – A method or monitor that is used to indicate whether an analyte is present at or above a specific concentration.

UNCERTAINTY IN FOUND MASS (UIFM) – One half the difference between the upper and lower 95% prediction limits of the found concentration at the target concentration divided by the target concentration. The UIFM is expressed as a percent.

4.0 QUALITY SYSTEMS REQUIREMENTS

4.1 Management Responsibility

4.1.1 Quality Policy

It is the policy of the Director, CB Services Directorate, located at U.S. Army Edgewood Chemical Biological Center, Aberdeen Proving Ground, to meet all regulatory and statutory requirements and customers needs during agent monitoring. This will be accomplished by supporting all Monitoring Branch efforts associated with the collection, handling and analysis of chemical warfare agents, and assuring that all of these operations are in accordance with (IAW) all appropriate SOP's and this QC plan. Executive management will ensure that the Quality Policy is disseminated and understood at appropriate levels of the organization.

The Monitoring Branch will provide analysts, operators, and sample technicians with the appropriate training and resources to perform quality work. The Monitoring Branch will implement a sound QA/QC Program for sample collection and analysis of DAAMS tubes and the operation of real time monitors. A trained audit staff, which is independent of the work being performed, will monitor the Branch's program for compliance with ISO 9001-2000 and the CQAPCAAM. The Monitoring Branch will strive for continuous improvement by stressing personnel, facility, and process improvement. Quality Objectives are addressed in paragraph 4.2.1.

4.1.2 Organization

The Monitoring Branch Office and Analytical Team are located in Building E3330 of the Aberdeen Proving Ground, Edgewood Area. Additionally, the Sample Collection Team is located in Building E3344 and the MINICAMS team in Buildings E3330 and E3348.

The organizational chart in Figure 1 depicts the Monitoring Branch reporting Interface within CB Services Directorate.

4.1.2.1 Responsibility and Authority

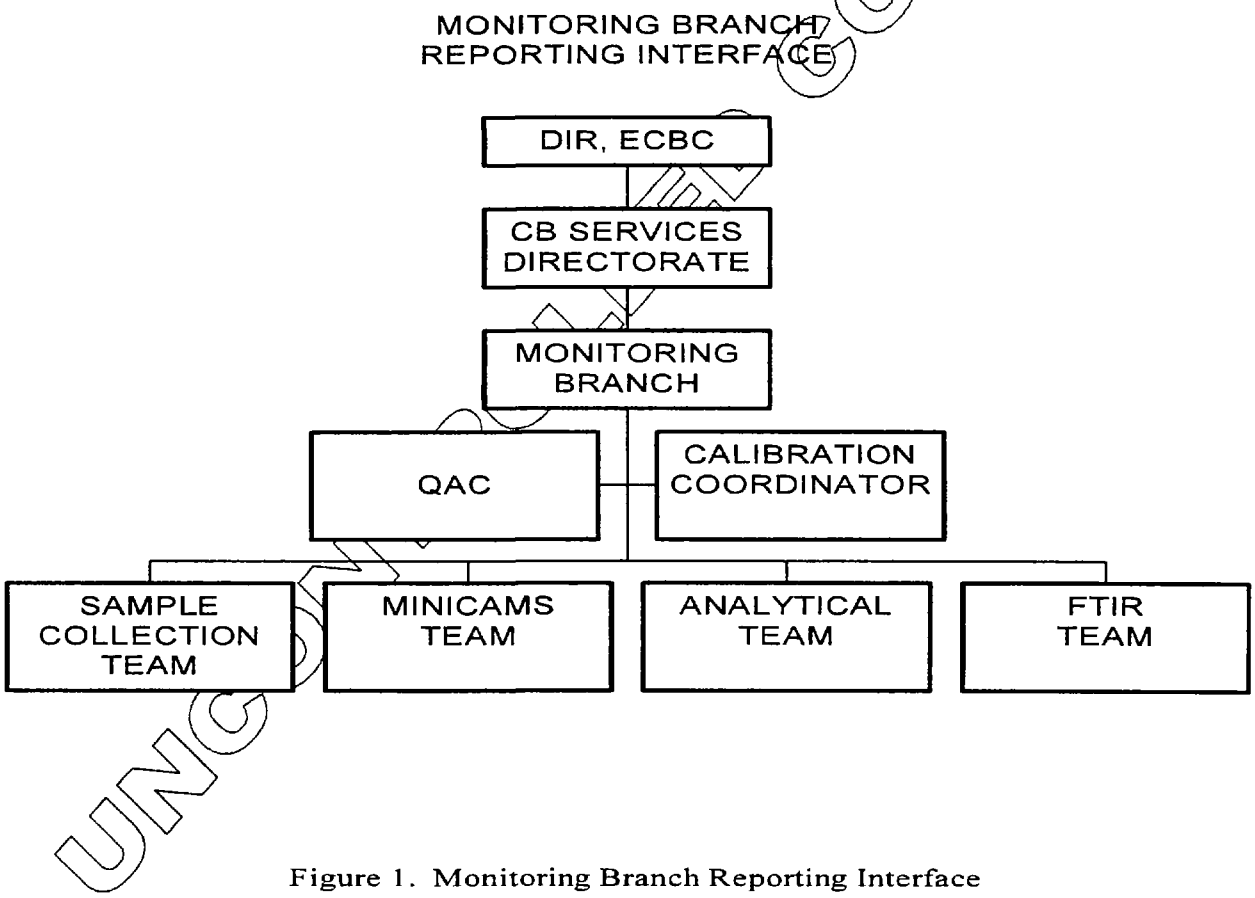

Figure 1. Monitoring Branch Reporting Interface

4.1.2.1.1 Chief of the Monitoring Branch

The Chief of the Monitoring Branch shall:

a. Be responsible for the fulfillment of quality assurance requirements throughout the monitoring program.

b. Brief the Chief of Chemical Applications Division on status of operations and/or problem areas.

c. Provide overall administrative support and technical guidance to the program.

d. Monitor charges versus funding levels

e. Review status of workload and labor requirements.

f. Review new work requests for their effect on operations and mission capabilities.

g. Appoint a Calibration Coordinator.

h. Appoint a Quality Assurance Coordinator (QAC).

i. Appoint an Analytical Team Leader (ATL).

j. Appoint a Sample Collection Team Leader (STL).

k. Appoint a MINICAMS Team Leader (MTL).

l. Appoint a FTIR Team Leader (FTL)

m. Ensure that the Monitoring Branch Quality Policy is implemented, maintained and understood at all levels in the organization.

n. Be the point of contact for the Monitoring Branch's Contractor.

o. Assign an internal auditor that is independent of the work being performed.

p. Conduct a Management Review of the Monitoring Branch Quality System, once a year.

4.1.2.1.2 Analytical Team Leader

The Analytical Team Leader (ATL) shall:

a. Have overall responsibility for data validation and for assuring that validated data is properly initialed and dated as required.

b. Have overall responsibility for the chemical analyses, including the technical merit of the analytical methodology, the fundamental analytical chemistry applied, and the fulfillment of quality assurance requirements.

c. Have overall responsibility for documenting all analytical methods used by the Analytical Team (AT) and ensuring that the AT is adhering to the methods.

d. Recommend additional personnel or equipment needs to Chief of the Monitoring Branch.

e. Coordinate laboratory efforts and schedules with Sampling Team.

f. Maintain close liaison with QAC. Provide for validation of analytical methods upon request from the QAC.

g. Inform Chief of the Monitoring Branch of laboratory problems that make laboratory data questionable, including out of control situations identified by the QAC.

h. Take corrective actions and document corrections for review by QAC and Chief, Monitoring Branch.

i. Have overall responsibility for the analysis of all QC blinds submitted.

j. Inform the appropriate personnel as soon as possible of the need to conduct confirmation analysis, especially on samples collected during operations involving personnel.

k. Have overall responsibility for making and maintaining a supply of fresh and reliable agent standards.

l. Have overall responsibility for reviewing analytical data in the LIMS for conformance to requirements and approving these data.

4.1.2.1.3 Analytical Team

The Analytical Team (AT) shall:

a. Be responsible for the chemical analysis of monitoring samples originating at U.S. Army Edgewood Chemical Biological Center (USAECBC) or collected at field operation sites.

b. Be directly responsible to the ATL to accomplish the objective stated above.

c. Conduct all analyses in accordance with safety and technical procedures provided by the ATL or in accordance with the appropriate site plan for field operations.

d. Analyze the QC and monitoring samples in an acceptable time frame.

e. Review QC sample data and provide data to the QAC or designated field personnel for final review.

f. Initial and date all analytical data sheets.

g. Maintain equipment maintenance logs in laboratory and/or MAP and inform appropriate personnel of equipment breakdown.

Immediately inform ATL (and field designated POC for off-site operations) of a monitoring sample greater than the AEL for that chemical agent. Conduct confirmation analyses for all positive results greater than 1 AEL.

h. Each team member is to read and sign the appropriate IOP's, as required.

i. Follow established protocols for entering analytical data into the LIMS (e.g., flows, times, results). Review all input information for correctness.

j. Review analytical data for completeness. Make corrections to data sheets before entering the data into the computer (or submitting sheets to Sampling Technicians for data entry).

k. Recall and print data or reports on request.

l. Review equipment calibration logs to ensure that all equipment is up to date. Report expired equipment to coordinator for replacement.

m. Maintain a current inventory of equipment and submit timely purchase requests for replacement.

4.1.2.1.4 Quality Assurance Coordinator

The Quality Assurance Coordinator (QAC) shall:

a. Review analytical data in the LIMS for conformance to requirements and inform ATL of problems.

b. Review QC Control charts for conformance to requirements. Review analyst certification data for conformance to requirements.

c. Provide reports to ATL/Branch Chief as required.

d. Review the QC standards and QC sample results submitted by team members.

e. Inform ATL and Branch Chief if the review of QC results shows the laboratory "out of control" or trending in that direction.

f. Maintain a discrete distance from laboratory operations; will not become part of the analytical team.

g. Review/generate corrective action reports.

h. Publish required reports.

4.1.2.1.5 MINICAMS Team Leader

The MINICAMS Team Leader (MTL) shall:

a. Assure the analytical data obtained through MINICAMS monitoring is provided to the QAC as required.

b. Have overall responsibility for MINICAMS sampling and preventive maintenance.

c. Be responsible for the fulfillment of Quality Assurance Requirements.

d. Provide/review IOPs of all analytical methodologies used by the MINICAMS Team (MT) and ensure that the MT is adhering to the methods.

e. Recommend/document additional personnel or equipment needs to Chief of the Monitoring Branch.

f. Maintain close liaison with QAC. Provide for analytical methods validation upon request from the QAC.

g. Inform Chief of Monitoring Branch of MINICAMS problems that will make data questionable including out of control situations identified by the QAC.

h. Initiate corrective actions and document corrections for review by QAC and Chief of the Monitoring Branch.

i. Have overall responsibility for the analysis of all QC blinds submitted.

j. Inform the appropriate personnel as soon as possible when MINICAMS detections occur and request confirmation monitoring when necessary.

k. Maintain a current inventory of equipment and submit timely purchase requests for replacement.

4.1.2.1.6 MINICAMS Team

The MINICAMS Team (MT) shall:

a. Be responsible for the analysis of samples using MINICAMS at USAECBC and other site locations.

b. Be directly responsible to the MTL to accomplish the objective stated above.

c. Conduct all analyses in accordance with safety and technical procedures developed for MINICAMS operations, as specified in appropriate IOPs.

d. Maintain proper records on quality control samples using MBFORM-4; MBFORM-2 and MBFORM-34, as appropriate.

e. Perform QC verification during monitoring activities within specified time frames.

f. Maintain operator certification by providing QC sample data to the QAC.

g. Initial and date all analytical data sheets.

h. Maintain normal maintenance on the MINICAMS and record information on QC sample data sheet.

i. Immediately inform the MTL, or designated field POC, of a MINICAMS sample greater than the AEL or alarm set point for the target analyte.

j. Inform MTL of required or depleted supplies (e.g., gases, preconcentrator tubes).

k. Each team member is to read and sign the appropriate IOP's, as required.

4.1.2.1.7 Sample Collection Team Leader

The Sample Collection Team Leader shall:

a. Maintain liaison with all agencies involved in surety operations and provide sampling support upon request.

b. Schedule and conduct all DAAMS Sampling operations.

c. Assure all Sample Technicians are trained. Assure all temporary, detailed and auxiliary personnel are trained or work under the oversight of trained personnel while performing sample collection procedures.

d. Review with the Chief of the Monitoring Branch the selection of sampling sites and the proposed sampling setup.

e. Inform the Chief of the Monitoring Branch of problem areas and periodically review status.

f. Inform the Chief of the Monitoring Branch of faulty equipment identified and replaced during monitoring, as required.

g. Maintain a current inventory of sampling equipment and submit timely purchase requests for replacement.

h. Maintain liaison with the LIMS Manager, QAC, and ATL to assure that adequate sampling data are being recorded.

i. Maintain a sufficient supply of solid sorbent tubes to conduct daily sampling.

j. Oversee the data entry by Sampling Team members to assure that the data are accurate, correct and completed in a timely manner.

4.1.2.1.8 Sampling Team

The Sampling Team (ST) shall:

a. Conduct all sampling operations. Trained sample technicians will conduct or oversee all sample collection operations. Temporary, detailed and auxiliary personnel shall be trained or work under the oversight of Trained sample technicians while performing sample collection procedures.

b. Set-up, collect, retrieve, log-in, and deliver samples to analysts.

c. Be responsible for routine maintenance of vehicles.

d. Conduct all operations safely and in accordance with sampling IOPs (MT-11 and any site-specific IOPs).

e. Accurately record all required sampling data. Make corrections on scratch logs and data sheets and have sampling data and/corrections reviewed for accuracy by another individual before entering the data into the computer/LIMS. Reviewing individual will also initial and date to indicate review has been made.

f. Recall and print data or reports on request.

g. Inform STL of problem areas and periodically review status.

h. Replace faulty equipment noted during monitoring setup and report these fixes to the STL.

i. Each team member is to read and sign the appropriate IOP's, as required.

4.1.2.1.9 FTIR Team Leader

The FTIR Team Leader (FTIRTL) shall:

a. Have overall responsibility for FTIR operation and preventative maintenance.
b. Be responsible for the fulfillment of Quality Requirements.
c. Provide/review IOP's methodologies used by the FTIR Team (FT) and ensure that the FT is adhering to the methods.
d. Recommend additional personnel or equipment needs to the Chief of the Monitoring Branch.
e. Inform Chief of Monitoring Branch of FTIR problems that make data questionable.
f. Initiate corrective actions and document corrections for review by Chief, Monitoring Branch.
g. Inform appropriate personnel as soon as possible when FTIR detections indicate presence of agent.

4.1.2.2 FTIR Team

The FTIR Team (FT) shall:

a. Be responsible for operating the FTIR in accordance with all Quality and Safety requirements.
b. Be directly responsible to the FTIRTL to accomplish the objective stated above.
c. Maintain FTIR operator certification as required.
d. Maintain all required records as required by operating procedures.
e. Immediately inform the FTIRTL of the detection/presence of agent.
f. Each team member is to read and sign the appropriate IOP's, as required.

4.1.2.3 Calibration Coordinator

The Calibration Coordinator shall:

Submit flow meters, balances, thermometers, etc. (equipment used to calibrate sampling equipment) for annual calibration and keep current record of the calibration.

4.1.2.4 Resources

The Chief of the Monitoring Branch shall plan and organize the resources of the Monitoring Branch to ensure that adequate resources are available for the work to be performed. The Branch Chief shall ensure that the personnel assigned to verify the quality system are adequately trained. Personnel assigned to perform internal reviews of the Monitoring Branch shall be independent of those having direct responsibility of the work being performed.

4.1.2.5 Management Representative

The Chief of the Monitoring Branch has been assigned the responsibility and authority for ensuring that the requirements of ISO 9001,2000 and the CQAPCAAM are implemented and maintained. The Management Representative will keep executive management informed as to the performance of the QMS and assure that all appropriate personnel are provided a copy of the QC Plan for their review and retention.

4.1.3 Management Review

The Chief of the Monitoring Branch is responsible for reviewing all aspects of the Quality System at least annually to ensure its suitability and effectiveness in satisfying the requirements of this QC Plan, its quality policy and objectives. This review will normally be completed prior to the annual CQAT audit. The Chief of the Monitoring Branch shall:

a. Review and evaluate follow-up actions from the last management review, corrective actions, control charts, internal and external audit reports, performance charts and out of control records for the determination and implementation of preventive actions.

b. Review and evaluate supplier performance for purchases under $2500 to assure that materials and services used by the Monitoring Branch are procured from suitable sources Keep a record of these suitable sources for future use.

c. Consider external influences such as new technology, changing or new regulations, organizational changes etc.

d. Generate recommendations, necessary changes and courses of action along with suspense dates if deemed necessary.

e. Initiate corrective actions, and monitor status of each action until all corrective actions are implemented, effective, and documented.

f. Review customer suggestions, comments, concerns and complaints for necessary action.

g. Evaluate whether quality policy objectives are adequate and are being met.

h. Review and assess, the need for changes to the quality system, the performance of the quality system and the need for additional resources.

i. Retain a record of each management review and forward an information copy to the Chief, Chemical Applications Division.

4.2 Quality System

The Monitoring Branch Quality system includes the QC Plan and references all SOPs, IOPs and other associated documents. The Master List of Documents containing all of the documents comprising the quality system, is maintained at the offices of the Monitoring Branch.

4.2.1 Quality Objectives:

The following quality objectives have been selected for evaluation as part of the organizations efforts for continual improvement of the Quality Management System. Quality objectives data will be analyzed and documented on a quarterly basis in an effort to monitor continual improvement of the QMS.

- Quality Objective: Complete sample analysis within a maximum of 72 hours after receipt of samples.

- Quality Objective: Report analytical results to customer within a maximum of 24 hours after completion of samples for analysis.

- Quality Objective: Review results of customer satisfaction surveys and document results of the analysis in an ongoing effort to improve customer service and satisfaction.

4.3 Contract Review

When contracts or work requests are received for services, they shall be reviewed by the Chief of the Monitoring Branch to ensure that the scope of each contract is clearly defined, contract requirements are adequately documented, and the capability to fulfill the contract exists. Verbal contracts or work requests shall be documented and reviewed as specified above and shall be signed or initialed and dated after the review. The Chief of the Monitoring Branch shall resolve differences with the point of contact originating the request. All questions/concerns and any amendments shall be documented on, or attached to, the original request form. All affected Monitoring Branch or contractor personnel shall be notified of any amendment.

Contracts will be initialed and dated to indicate that this review has been performed. (See form MBFORM-17, Monitoring Branch Work Request.)

4.4 Document and Data Control

The Monitoring Branch QC Plan will be controlled by assigning a revision number to the plan. Revisions will be published and distributed as necessary to keep the plan current. SOPs are not controlled by the Monitoring Branch. SOPs are maintained, revised and distributed IAW ERDEC-SP-058. Additional documents of external origin are listed on the master list and their distribution is controlled.

All documents, data (including forms), and internally developed computer software are controlled Quality documents that are controlled by revision number, date and document number and are legible, identifiable, reviewed for adequacy and approved by authorized personnel prior to use. Quality documents are maintained electronically. Hard copies are available for most quality documents in Monitoring Branch files. A master list is maintained electronically that includes all authorized documents and forms with their current revision number and date.

Distribution of the Monitoring Branch QC Plan is controlled and managed as follows:

a. Each controlled copy is assigned a sequential control identification number. The Monitoring Branch maintains a log of controlled copies. The log contains the control identification number and the name of the copyholder.

b. Procedure for distribution of QC Plan:

   1) Notify all holders of record via e-mail to turn in old document and pick up and sign for the new document within 2 weeks of notification.

   2) Holders of documents who have not complied within the 2-week time frame will be contacted via telephone and advised to bring their old document for turn-in and sign for the new document.

   3) Off site holders will be notified via e-mail and/or telephone that their current document is obsolete, that they should return the old document and sign for the new one. If they no longer require an updated copy, the old copy may be returned or marked obsolete and they will no longer be holders of record for the new document.

   4) A copy of the new document will be "hand carried" to on site personnel who have not responded to the original notification within six weeks. They will be asked to turn in the obsolete copy and sign for the new one.

c. Changes to the document will be furnished to all copyholders of record.

d. Uncontrolled copies of the plan shall be marked "Uncontrolled" at the time of issue.

e. Each page of the QC Plan shall contain a revision number.

4.4.1 Document and Data Approval and Issue

The Monitoring Branch QC Plan shall be denoted with an approval authority signature from the Chief, Chemical Applications Division, revision date, and revision number. The Monitoring Branch IOP shall be denoted with an approval authority signature from the Chief of the Monitoring Branch, revision date, and revision number.

The Monitoring Branch shall maintain a master list of all QC Plans, internal operating procedures, forms, applicable external documents, and software programs. The list shall identify the current revision and date of each item to preclude the use of non-applicable and obsolete documents and software programs. All operating personnel shall have access to the latest revision of all appropriate SOP's and IOPs for their reference and use.

Information used as work instructions that have been extracted from any quality document shall be annotated with the revision number and date of the original document from which it was taken.

4.4.2 Document and Data Changes.

4.4.2.1 Minor Document and Data Changes

Minor and editorial changes to Monitoring Branch quality documents and SOPs may be made in ink and approved by the Branch Chief. When minor changes are made, all copyholders of the controlled document shall be notified.

Any change in data that affects data quality shall contain the initials of the person making the change and the date of the change. The change must be made in such a way that the original data are still legible (i.e., make a single line through the data).

4.4.2.2 Major Document and Data Changes

As a result of document and/or data review, major changes to data and documents are made as necessary and shall be recorded. Records of changes to documents shall be maintained as they are made including the nature of change, revision number, and date of revision. Major changes to documents and data shall be reviewed and approved by the same functions that performed the original review. Personnel performing the review shall have access to the pertinent background information upon which to base their review and approval. A written record of review and approval of major changes shall be maintained. This record shall be documented by signature authority of the Chief of the Monitoring Branch.

When major changes are made to the Monitoring Branch QC Plan, the revision number and the date of revision shall be updated. In the interim, changes will be made by sequentially numbered change notice.

Obsolete or superseded procedures and documents in the work area shall be removed unless marked accordingly.

4.4.3 Retention of Documentation

To ensure traceability, a copy of the previous revision of the Monitoring Branch QC Plan, IOPs and SOPs (if possible) shall be retained in the Monitoring Branch records. The copies shall be marked to identify them as obsolete documents.

Analytical results are retained in the Monitoring Branch files for a minimum of one year then may be transferred to the Government storage facility. Analytical results are retained for forty years in accordance with regulatory requirements and may be retained/stored on hard copy or electronically on Disc as applicable.

All Quality records are currently maintained electronically and on CD's or hard copy. Laboratory analytical results are maintained electronically on the Laboratory Information Management System (LIMS) and on hard copy until put on CD's. Off site data is maintained electronically on the instruments and on hard copies that are then scanned to put information a

CD for long-term storage. MINICAMS monitoring data is printed on hard copy and also stored on floppy discs, then ultimately transferred to CD's for long-term storage. See IOP's MT-27 & MT-28 for details of indexing, filing, storage and retrieval of analytical data records.

4.5 Purchasing

4.5.1 General

The Chief, Monitoring Branch, shall ensure that all products purchased for the operation of the Monitoring Branch conform to the specified requirements.

All chemicals required to make reagents and standards are to be at least reagent grade.

4.5.2 Assessment of Sub-Contractors.

The local procurement directorate maintains a list of approved contractors/sub-contractors with a history of successful performance for supplying quality goods. This list is used for procurement of routine supplies except as indicated below. Supplies whose dollar value is less than $2500 may be purchased using a credit card. These purchases are reviewed and approved by the Branch Chief or his designee, in accordance with the Government approved system. **A list of approved vendors will be maintained for locally procured supplies.**

For sub-contractors performing analyses, monitoring equipment operation and/or maintenance, the Monitoring Branch Chief ensures that the sub-contractor's quality performance is in accordance with the Monitoring Branch Quality Control Plan. This is accomplished by: meetings, ongoing discussions, e-mail, etc., with the subcontractor to discuss QC procedures and data results. All operations performed by the sub-contractor that relate to chemical agent air monitoring are subject to audit by Monitoring Branch personnel as part of the internal auditing process. Sub-contractors are also subject to audit by external organizations such as the CQAT.

4.5.3 Purchasing Data

The Chief, Monitoring Branch, or his designee, will verify, review, and approve purchase requests by initialing and dating an electronic copy or the hard copy of the purchase request prior to forwarding to procurement. The initialed copy will be maintained in the Branch files. The Chief, Monitoring Branch or his designee, shall assure the request contains the appropriate information prior to approval, such as the following:

a. Supplier name, address, phone, and point of contact

b. Catalog number, description, unit cost, quantity needed, and justification of need

c. Type, style, class, grade, or other precise identification

d. Title or other precise identification and applicable issue for: specifications, drawings, process requirements, inspection instructions, and other relevant technical data.

4.5.4 Verification of Purchased Product

The Monitoring Branch contracts do not specify verification by the customer at the subcontractor's premises. Therefore, this section does not apply.

4.6 Customer Supplied Product

The Monitoring Branch has an agreement to provide DAAMS tubes to "off site" customers that are used to sample designated areas at the customers facility, these DAAMS tubes are then returned to the Monitoring Branch Laboratory for analysis. These "off site" DAAMS tube samples are subjected to the same analytical and reporting procedures used for on site DAAMS tube sample analysis.

4.7 Product Identification and Traceability.

DAAMS tubes used in the collection of samples by Monitoring Branch or contractor personnel have a unique ID number. A field label is attached to each DAAMS tube carrier. The field label shall contain both DAAMS tubes numbers, initial and final flow rates, pump number, location, item sampled, and collection start and stop times.

The information from the field label is transferred to the Air Sample Work Order (MBFORM-39) then to the LIMS, which assigns the unique sample ID number and generates a sample label and scratch log (MBFORM-72). The sample label is placed with the field label and the sample is delivered to the analyst. The sample label remains with the sample until the analysis is determined to be in control. The label is then removed from the sample, attached to the corresponding quantitation report. If the second tube is analyzed, there is no sample label attached. The Analyst prints the data sheet report (MBFORM-6) from the LIMS and submits it with the data packet. Quantitation reports are filed in the Monitoring Branch for one year and then transferred to the SBCCOM Historical Research & Response Team storage area.

The LIMS generates the unique sample ID number before each sample is analyzed, using the following rules:

a. The first two numbers are the last two numbers of the year.
b. The third and fourth numbers are the number of the month in which the sample is collected
c. The fifth and sixth numbers are the day of the month the sample is collected
d. The seventh through tenth numbers are the sequential number of samples collected in the month. (These numbers reset at beginning of each month).
e. The final digits are separated from the first ten digits by a dash, and indicate the location where the sampling data were entered in the computer. These last digits are called

SiteExtensions. Samples entered at the Monitoring Branch Sample Team office have an extension of M01. Other locations have unique extensions defined in the LIMS.

An example of a sample ID number is 9209180125-M01. This ID number indicates that the sample was taken 18 September 1992, was sample number 125 for the month, and the data were input on the computer at the Monitoring Branch.

When a sample is cleared, the sample ID number (with the agent of interest appended) serves as the clearance number for Monitoring Branch customers.

The status and custody of a sample shall be tracked using the scratch log (MBFORM-12) originating from the Monitoring Branch Sample Team. The analyst signs and dates the chain of custody section on the scratch log to verify receipt of samples, which are delivered to the analyst. The sample identification numbers and corresponding data shall go into the LIMS for 40-year storage.

Daily Report. The results of daily runs are recorded on the daily report sheet. The Daily Report cross-references the sample ID number with the LIMS-generated sample designator. The sample analysis results are stored electronically.

Daily Report (MBFORM-36 or 52) generated by Excel, is used to record data for field operations.

4.8 Process Control

The processes that must be controlled are the following:

1) Sample Collection
2) Sample Analysis
3) Data Reporting
4) Data Storage

The specific controls for each of these processes are specified in specific IOPs.

There are no other special processes that require special controls.

Sample collection procedures using DAAMS tubes are contained in the IOP MT-11 entitled DAAMS Tube Monitoring Procedure.

MINICAMS Monitoring Procedures; sample analysis and data reporting procedures are contained in the following IOPs:

- IOP MT-13, Analysis of Chemical Warfare Agents and Degradation Products on DAAMS Tubes using Gas Chromatography System Coupled with a Mass Selective Detector (GC/MSD).

- IOP MT-19, Analysis of Chemical Warfare Agents and Degradation Products on DAAMS Tubes using Gas Chromatography System Coupled with a Flame Photometric Detector (GC/FPD).

- IOP MT-2, Operation and Maintenance Procedures for Fixed Site MINICAMS at APG.

- IOP MT-16, Operation and Maintenance Procedures for MINICAMS Mounted in a Mobile Configuration.

The Monitoring Branch has instituted a process of scanning Hardcopy Data for storage on CD's. This process will be used for long-term data storage in the future.

4.8.1 QC of Methods and Monitors

In addition to the certification requirements for instruments, monitors, and analysts/operators, quality control samples shall be analyzed to provide quantitative evidence that the entire method or monitor is performing at a level comparable to or better than that demonstrated during certification (±25% accuracy with 95% confidence). Control samples are introduced into the train of samples to function as checks on the performance of the analytical method. Data generated from the control samples are plotted on control charts and/or other forms of documentation. Data generated from field operations control samples may be control charted if deemed appropriate.

4.8.1.1 Control Samples

A Quality-Process (QP) sample is a quality control sample that has been spiked with a solution of dilute chemical agent and exposed to the sampling environment. QPs within 10% of the AEL are routinely employed to assess the recovery performance of the MINICAMS and DAAMS methods. The QP sample is carried through every step of the sampling and analysis system being used, including as appropriate, the VX conversion pad, the heated sample line, pumps, instruments, and data processing. DAAMS tubes are spiked with solution of dilute chemical agent and then placed at a site representative of where actual samples are being collected and aspirated for the same time and same flow rate as actual samples. These QC samples are returned to the laboratory or Mobile Analytical Platform (MAP) for analysis with actual field samples.

A Quality-Laboratory (QL) sample is a quality control sample that has been spiked with a solution of dilute chemical agent in the laboratory but which has not been aspirated. QLs are spiked with a solution containing all the analytes of interest at approximately 75% of the AEL.

These samples are routinely employed to assess the performance of the DAAMS method instruments.

Quality Control Sample Documentation. The following information shall be recorded on MBFORM-36, MBFORM-46, MBFORM-50, or MBFORM-52 as appropriate, for QC samples associated with DAAMS tube analysis batches:

- QC sample number
- DAAMS tube number, when applicable
- Dates of sample analysis
- Sample location
- Agent(s)
- Agent standard number.
- Found concentration(s) (FC)
- Instrument number
- Analyst name or initials

The following information shall be recorded for QC samples analyzed using the MINICAMS:

- Date
- Monitor ID
- Agent(s)
- Operator
- Found concentration (FC)

4.8.1.2 Control Sample Loading

4.8.1.2.1 GC Methods

DAAMS tube samples are generally analyzed using GC techniques that are considered Type 1 methods. Control samples will be introduced and evaluated as follows:

- A 1-AEL QP sample shall typically be run at least every 20 samples for each day of operation on each instrument for each type of analysis, in accordance with the requirements of the appropriate IOP.
- A 0.75-AEL QL sample shall be run prior to analyzing samples with a minimum of two QL samples for each method, instrument, and day of operation in accordance with the appropriate IOP.

The Monitoring Branch uses one Type 2 method/instrument intermittently as a fixed site monitor for stored munitions. The calibration and operation requirements are contained in IOP-MT-5. A new IOP will be written for any additional Type 2 methods used by Monitoring Branch.

4.8.1.2.2 Near-Real-Time (NRT) Systems

The near-real-time (NRT) systems deployed by Monitoring Branch are MINICAMS equipped with heated sample lines. Air is introduced directly into these systems, rather than being sampled (e.g., onto DAAMS tubes) before being introduced into the analytical system. These systems are calibrated and operated as Type 1 monitors in accordance with IOP MT-2 for fixed sites and IOP MT-16 for mobile operations.

GCs equipped with heated sample lines (also called HP5890/Dynatherm systems or HPDs) are occasionally used for near-real-time (NRT) monitoring by Monitoring Branch.

Note: The ADAM located at N-field is operated as a Type 2 system IAW IOP-MT-5.

Fixed-site NRT systems shall be calibrated and challenged at least once per working day. . For fixed-site applications, QPs that include the HSL must be challenged at least every three months. The frequency and method of challenges are described in IOP MT-2.

Mobile NRT systems shall be calibrated and challenged through the heated sample line before operations, after five hours, (if operations exceed five hours), and at the end of daily operations. If the agent being monitored changes for a given monitor at any time during the operational day, the MINICAMS will be challenged for the new agent prior to starting operations with the new agent if instrument parameters are changed. The frequency, and challenge acceptance requirements are described in the appropriate IOP-MT-16.

First challenge acceptance tracking is usually performed to monitor calibration stability over two or more days. NRT systems used by the Monitoring Branch are calibrated daily before the first QP challenge. Consequently, the rate of first challenge acceptance is not a relevant measure and is not tracked.

4.8.2 Type 1 Method Control Charts

Control charts are used to monitor variations in GC method precision and accuracy and to detect trends in these variations. The QL results of each analyte must fall within ±15% of the true value, except as noted in the appropriate IOP. The average and range of the daily QLs for each method and instrument will be control charted IAW the CQAPCAAM and must fall within control chart limits. Control charting of QPs is optional.

Control charts shall be generated using the computer software provided by the CASARM Quality Assurance Team (CQAT) or control charts shall be generated using the QC package

module from the LIMS. The software shall calculate the control limits for each operation and instrument.

4.8.2.1 Contents of QL Control Charts

The average FC and range is plotted on the y-axis and data points are plotted on the x-axis.

Control charts shall clearly state the following:

- Instrument ID.
- Title of the chart
- Analyte (agent) and AEL
- Method (e.g. DAAMS)
- Laboratory identity
- Month and year; date of preparation
- Analysis data for each point plotted (tabular)
- Percent Recovery or Range of Recovery on the Y-axis
- Upper and lower control limits (UCL and LCL)
- Grand mean average Xdoublebar on the Xbar chart as the central line (solid line).
- Mean range Rbar on the R-chart as the central line(solid line).

X-bar and R control charts may be plotted on different pages.

4.8.2.2 Updating & Maintaining Control Charts

Initial QL control charts are prepared from the first 20 data points for each agent and instrument. (see 4.8.2.) A minimum of 20 data points will be used to establish control chart data limits. Control chart data limits are considered to be permanent limits for the process and shall not be changed unless the process changes. If a known process change requires updating the control chart data limits, a minimum of 20 data point will be required prior to changing the data limits.

4.8.2.3 Out-of-Control and Out-of-Statistical-Control Situations

See appropriate IOP.

4.8.3 Type 1 Monitor Performance Charts

The purpose of performance charting is to monitor variations in the QP challenge results of NRT analyses (as defined in Section 4.8.1.2.2) and to detect trends in those variations. Performance charts are based on QP data for each Type 1 monitor. Performance charts for Type 1 monitors are not required if instruments are calibrated each workday.

4.8.3.1 Contents of Performance Charts

The performance charts will contain the following information:

- Title of the Chart
- Identification of Agent
- Identification of first and, if required, second Type 1 monitor challenge for a given day
- Date of data collection
- Found Concentration on the y-axis
- Data point on the x-axis
- Performance bounds
- Initials of operator

See appropriate IOP for performance chart limits.

4.8.3.2 Performance Chart Calculations

Due to the difficulty of preparing a spiking solution at exactly 1.0 AEL, the laboratory is permitted to deviate from this value by ±10%. The QP target concentration (TC) is normalized to 1.0 AEL for the hazard level standard as follows:

$$\frac{TC\ (Z)}{1.0\ (Z)} = Z - factor$$

The QP response is calculated as follows:

$$\frac{\text{Found Concentration}}{Z - \text{factor for } 1.0\ Z} = \text{QP response}$$

4.8.3.3 Out-of-Control and Out-of-Statistical-Control Situations for Type 1 Monitors

See appropriate IOP for details of out of control & out of statistical control. e.g. IOP-MT-2 & IOP MT-16.

4.8.4 Special Processes

There are no special processes whose processing deficiencies may become apparent only after the product is in use. Therefore, this section does not apply.

4.8.5 Quality Control of Heated Sample Lines (HSL)

All heated sample lines must be challenged before their initial use. The challenge shall consist of a LOW LEVEL injection of each agent to be sampled through that HSL. A found concentration within ±50% of the target concentration is the criterion for acceptance. Two successive failures call for corrective action or replacement.

HSLs installed on systems at fixed sites shall be challenged every three months with each agent used in that line to ensure that the line is functioning correctly. The three-month challenge acceptance criteria shall be the same as that used for initial acceptance. Records shall be maintained to demonstrate conformance to this requirement. These records shall include agent, date, operator, instrument identification, target concentration, and found response. Lines that do not meet challenge criteria will be marked and removed from use.

HSLs on mobile monitors shall be challenged each day of operation IAW the appropriate IOP.

4.8.6 Quality Control of DAAMS Tubes

New DAAMS tubes shall be subjected to the following tests, or the manufacturer shall supply documentation with each lot purchased, attesting that the lot of DAAMS tubes has been subjected to these tests and meets all requirements. The number of tubes to be pulled for testing is found in Table 1.

- Sampling/Acceptance Requirements:
  - Sample number is IAW ANSI/ASQC Z1.4, AQL of 2.5% non-conformance
- Inspection Requirements:
  - Visual Inspection for Loose packing, warped tube ends, and loose sorbent material
  - Pressure-drop test to assure sufficient airflow through the tube. For each type of tube listed, the pressure drop may not exceed to value listed.
    - DAAMS-6mm tube-Chromosorb 106 15 inches Hg
    - DAAMS-6mm tube-Tenax TA 15 inches Hg
    - DAAMS-8mm tube-Chromosorb 106 8.0 inches Hg
    - DAAMS-8mm tube-Tenax TA 8.0 inches Hg
    - DAAMS-15mm tube-Haysep D 15 inches Hg

- Transfer tube-Chromosorb 106 4.5 inches Hg
- Transfer tube-Tenax TA 7.0 inches Hg

- Agent tests shall be conducted in accordance with the requirements of IOP-MT-4

Table 1. Samples Sizes for Normal Inspection for Maximum of 2.5 Percent Non-Conformance

LOT OR BATCH SIZE	GENERAL INSPECTION LEVEL 1, number of samples	REJECTION NUMBER a
2 – 8	2	1
9 – 15	2	1
16 – 25	3	1
26 – 50	5	1
51 – 90	5	1
91 – 150	8	1
151 – 280	13	2
281 – 500	20	2
501 – 1200	32	3
NOTE: [a]Reject the entire lot if this number of samples is found to be defective.		

4.8.7 Quality Control of Preconcentrator Tubes (PCT)

Each PCT shall be successfully challenged with a low level challenge (LLC) before use.

4.8.8 Quality Control of Silver Fluoride Conversion Pads

4.8.8.1 Initial Testing

Each new silver fluoride (AgF) conversion pad will be tested with a LLC or HL challenge when installed for use. Response shall be ±0.25% of target concentration for HL QP's and ±0.50% for LLC or the following tests will be performed as indicated.

New silver fluoride (AgF) conversion pads shall be subjected to the following tests, or the manufacturer shall supply documentation with each lot purchased attesting that the lot of pads has been subjected to these tests and meets all requirements. The number of pads to be pulled for testing is found in Table 1.

Note: **For Silver Fluoride conversion pads only**: Table 1 reject numbers are changed to: Reject numbers for lot sizes: 91-150 =2, 281-500=3, 501-1200=4.

- Sampling/Acceptance Requirements:
  - Sample number is IAW ANSI/ASQC Z1.4, AQL of 4% non-conformance

- Inspection Requirements:
  - The requisite number of samples from each new batch of conversion pads will be challenged with a spike of approximately 3.6 ng VX and an equal molar GB spike (1.89 ng GB is the molar equivalent at 100% pad efficiency). Acceptable conversion pad performance shall be recovery of at least 75%.

Conversion pads shall expire one year from date of manufacture, or may be used as long as recovery test results are acceptable. Conversion pads shall be stored out of direct sunlight to maximize the pad's ability to convert VX to its G analog and to minimize exposure to atmospheric contamination.

4.8.8.2 On-Going Testing

According to the NIOSH recommendation in "Special Report on VX: Evaluation of Pesticide Interference and Evaluation of Conversion Pad Service Life," conversion pads for AEL-level methods will be replaced as operational experience dictates, for each Type 1 method/monitor station during VX operation. Pad replacement for IDLH-level methods will occur as follows:

QL &QP samples for V-to-G analytical batches are prepared with conversion pads. New pads are installed as specified in the appropriate IOP.

As described in Section 4.8.1.2.2, the Monitoring Branch performs challenges of NRT systems through the conversion pads (where appropriate) at the inlet or at the end of the heated sample line. During VX operation, a new pad is installed in the system weekly or as required. After a successful challenge, samples are analyzed through the pad according to operating protocols.

4.9 Inspection and Testing

4.9.1 Receiving and Inspection Testing

Products received by the Monitoring Branch that must be inspected include chemicals, glassware, analytical equipment, preconcentrator tubes, conversion pads, and DAAMS Tubes. Also see Sections 4.8.6, 4.8.7, and 4.8.8.

4.9.1.1 Verification of Incoming Supplies

All products received by the Monitoring Branch shall be verified upon receipt for condition, completeness, identification, and general compliance with the procurement document requirements. A knowledgeable person shall initial and date the incoming receipt form to indicate acceptance. Any problems with the product shall be noted on the incoming receipt form and the procurement activity shall be notified. Unusable supplies shall be returned to the

supplier activity, if possible. A copy of the Purchase order and the dated and initialed incoming acceptance form shall be retained in the MB office files.

Supplies and products received from the Monitoring Branch support contractor are verified as described above. A copy of the purchase order accompanies the products that are delivered to the contractor representative at the Branch. After inspection and verification, the copy of the purchase order is initialed and dated, and returned to the contractor's main office for payment and permanent storage. The contractor's purchasing agent ensures that unusable supplies are returned for credit and that any problems are resolved. A copy of the Purchase order and the dated and initialed incoming acceptance form shall be retained in the MB office files.

4.9.2 In-Process Inspection and Testing

Monitoring Branch personnel responsible for collecting samples shall inspect the DAAMS tube flow rates before and after an operation to assure that the proper flow rate is achieved. Flow rates that do not meet specifications shall be reported on the corresponding field label and sample label. Sample times and any out of the ordinary weather conditions shall also be recorded.

Samples received at the laboratory will be inspected and verified by the laboratory chemists. Receipt will be noted on the scratchlog along with any discrepancies or anomalies.

The average flow rate for MINICAMS, is printed with Instrument parameters. Any flow rate that does not meet the method specification shall be documented on the challenge data record (MBFORM-4). Corrective actions shall be taken to assure that the proper flow rate for that particular operation can be achieved before starting the operation. All corrective actions shall be documented on the challenge data record.

Flow rates of heated sample lines on fixed site MINICAMS; ADAM and HPDs shall be checked each three months. All flow rates shall be documented on MBFORM-34 (Heated Sample Line Quarterly Challenge Sheet). Corrective actions shall be taken to assure that the proper flow rate can be achieved. Actions taken shall be recorded on the challenge data record.

4.9.3 Final Inspection and Testing

Samples whose integrity is questionable during sample collection (e.g., broken or discolored) are rejected and re-sampled. Sample technicians responsible for collecting DAAMS samples shall inspect the sample label for completeness and accuracy, and sign and date the appropriate section of the scratchlog prior to its release to the laboratory. See MT-11.

The Monitoring Branch shall establish and maintain records to demonstrate that final inspection has been completed for the following items:

- Analysis results (transcriptions and calculations) are recorded on the Daily Report and are verified and distributed by the ATL or designee. The Daily Report will be initialed and dated to demonstrate the verification. The STL or designee verifies sample information entered in the 40-year database. The STL will log on to the LIMS, verify the data against the hard copy version, and print the Data Sheet (MBFORM-11). This report contains the reviewer's name and validation date.
- After review and acceptance by monitoring branch personnel, analytical results are reported to the designated POC for the requesting agency/group.
- Sample information generated during field operations is entered into the MAP analytical equipment for later download and entry into the 40-year database. The STL or designee performs data verification before releasing sample results.

4.9.4 Inspection and Test Records

Records of inspection shall be maintained where appropriate. Records of inspections of incoming material shall be made on the copy of the request (reviewers will initial and date) and filed in Monitoring Branch files. Contractor procured items shall be handled as described in paragraph 4.9.1.1.

4.10 Inspection, Measuring, and Test Equipment

All equipment requiring periodic calibration shall have a sticker/tag affixed to the instrument (or readily available) indicating the calibration status of the equipment. Equipment that is not in use shall be annotated as such. Obsolete or unusable equipment is turned in for disposal. See Section 4.10.3 below for details about the calibration program.

4.10.1 GC/FPD and GC/MSD SYSTEMS

For operation procedures: See IOP's MT-13 and MT-19.

As a minimum, the following information shall be recorded as part of the analytical data package.

- Analysis Date
- Instrument ID
- Analyst/Operator
- Standard ID Number(s)
- Instrument Response
- Regression Parameters

- Target Concentrations

4.10.2 MINICAMS Systems

Both fixed and mobile MINICAMS systems are calibrated and challenged in accordance with Internal Operating Procedures (IOPs). Specific calibration and operating procedures are detailed in the following:

- IOP MT-2: Operation and Maintenance Procedures for Fixed Site MINICAMS at APG
- MT-16: Operation and Maintenance Procedures for MINICAMS Mounted in a Mobile Vehicle

Calibration and challenge data are recorded on MBFORM-4.

4.10.3 Edgewood Area Calibration Program

Balances, flow controllers, flow calibrators, and flow meters used within the Branch are currently included in the calibration program at Aberdeen Proving Ground, Edgewood Area. The Edgewood Area Internal Calibration Facility (EAICF) maintains the calibration program and provides a calibration report on equipment calibrated. The Calibration report contains the following information:
Acceptance and Reject Criteria for instrument being calibrated, Name of person performing the calibration and the reference standard used to calibrate the instrument. Equipment not meeting calibration requirements is tagged and removed from service.

When the Monitoring Branch receives new measuring equipment, the Calibration Coordinator must inform the EAICF and provide the stock number and interval of calibration so that this equipment can be added to the calibration list. Periodically, the EAICF provides a list of the type of the equipment, model and serial numbers, date of the last calibration, and calibrations due during the next 60 days. The Calibration Coordinator monitors this list and coordinates the calibration of the expiring measuring equipment with the EAIFC. The Calibration Coordinator ensures that all equipment requiring calibration has a completed calibration label DA80 attached or readily available. The date of the last calibration, and the date the calibration expires are noted on the label. Equipment that fails calibration, has exceeded the calibration date, equipment not being used or equipment that requires calibration before use is marked accordingly. Items in the EAICF calibration system are automatically recalled. The Calibration Coordinator arranges for the item to be delivered to the calibration team. The Calibration Coordinator keeps the current calibration report on file. Calibration records shall be maintained in the Monitoring Branch.

4.11 Sample Storage and Labeling.

Standards and samples not analyzed on the day received shall be stored in a refrigerator at or below 4°C. DAAMS tubes must be placed in a second glass container. Each tube will be

labeled and tracked through analysis. After the sample is analyzed, the sample ID label is removed from the sample container and placed on the analysis report for the sample indicating that the analysis is complete. However, only after the sample has been analyzed and the results have been certified and properly documented, can the sample be discarded and the collection container cleaned, if necessary. Samples that are held for confirmation remain tagged until analysis is completed. Samples held overnight are refrigerated. These samples are segregated and kept on a separate shelf, if possible. The following information is displayed on the sample label:

- Sample ID number
- DAAMS tube number, if applicable
- Agent(s) sampled
- Building number
- Item position number
- Date collected
- Point of contact and phone number
- Time sample collected
- SOP number, if applicable.

4.12 Control of Non-conforming Product.

If the Sample Technician detects a nonconforming sample by physical inspection (both tubes bad), he/she shall notify the STL that the sample is compromised and that the site needs to be re-sampled. If only one tube is bad, the reason for rejection shall be noted in the database, and the second tube shall be delivered to the lab for analysis, at the discretion of the STL.

If the analyst detects a nonconforming sample by physical inspection, he/she shall record that the sample is rejected for analysis and the second sample tube shall be run. If the second sample also fails, the ATL or designee will notify the STL that the site needs to be re-sampled. For a sample that fails analysis criteria, the sample is rejected and the sample label shall be affixed to the analysis report.

The laboratory shall be responsible for the disposition of the samples. Broken tubes are destroyed; all others are conditioned for subsequent use.

Reports/data which are determined to be incorrect in the final inspection shall be annotated with the correct information, including the date and initials of person making the notation. The results are returned to the originating personnel for correction, or the reviewing official or the QAC will make the correction.

Non-conformity Review and Disposition. The responsibility for review and authority for the disposition of non-conforming data are given to the Chief of the Monitoring Branch or his designee.

4.13 Corrective Action.

When problems in a Quality System are identified, the Branch Chief or QAC shall assign staff members to investigate the problem. The assigned staff member shall initiate a Corrective Action Report (CAR), (if one has not been initiated). The CAR shall include:

a. Description of the problem

b. Date the problem was discovered

c. Investigator(s)

d. Result of investigation, including causes of the problem

e. Corrective actions to be taken

f. Corrective action implementation date

g. Changes resulting from corrective actions (also noted in operating procedures, as necessary)

h. Procedural changes resulting from corrective actions will be made to quality documents as required.

i. Verification to include:

   1) Date

   2) Effectiveness of corrective actions

Procedures for completion of the corrective action report are contained on the back of the Corrective Action Form (MBFORM-3).

The staff member shall then perform an investigation to determine the cause(s) of the problem. This investigation shall also include the development of corrective actions that correct the problem and prevent its reoccurrence. The results of the investigation shall be documented on the CAR, signed by the investigator, and reviewed and approved by the Team Leader prior to implementation. The Team Leader shall verify the effectiveness of the corrective action.

CARs that are open shall be placed in a separate file folder than those that have been closed.

4.13.1 Preventive Action.

Preventive actions are addressed in as follows:

Preventive actions required to prevent or reduce problems associated with routine Monitoring Operations shall be addressed during branch meetings, during ongoing reviews of routine monitoring operations, and other times deemed necessary in an ongoing effort to improve the quality of monitoring branch operations. Once a potential problem is identified, the Branch chief may proceed as indicated below:

The Branch Chief or QAC may assign staff members to investigate the potential problem to determine what actions are required to prevent the potential problem. The assigned staff member shall:

a. Determine what could cause the problem.

b. Determine actions required to prevent the problem from occurring.

c. Initiate preventive actions or request appropriate personnel to initiate actions to prevent the problem.

d. Review completed preventive actions and report such action(s) has/have been completed and is effective.

4.13.2 Customer Satisfaction:

Customer satisfaction shall be monitored by the use of:

- Customer Surveys
- Reviewing customer complaints etc.
- Completed customer surveys shall be evaluated by the Monitoring Branch chief.
- Survey results indicating problems will be addressed on an individual basis as deemed necessary.
- Customer complaints shall be addressed by the appropriate Team Leader. If deemed necessary, a CAR will be issued for the complaint. CARs resulting from customer complaints shall be filed in a separate folder from those originating internally. Open CARs shall be placed in a separate folder from those that are closed.

4.14 Collection, Handling, Delivery, and Analysis.

4.14.1 Collection.

DAAMS tubes shall be collected by trained personnel. DAAMS tubes shall be collected at USAECBC IAW IOP MT-11 entitled DAAMS Tubes Monitoring Procedures. DAAMS tube

samples from off-site locations shall be collected IAW the appropriate IOP as specified in site plan. Minimum sample times are calculated for DAAMS tube samples used for confirmation to insure that the desired level of confirmation is obtained.

4.14.2 Handling.

The ST will initiate efforts at the time of sampling to preserve the integrity of the samples. All tubes shall be placed into their glass carriers, frit end down, as soon as they are removed from the sampling station. The samples shall be transported as soon as possible to the point of analysis. Upon receipt, an AT member will prioritize the tubes for analysis. Sample analysis will be conducted IAW appropriate IOP. Samples not analyzed on the day collected are refrigerated until analyzed, as described in Section 4.11.

Data (analytical results) are furnished to the agency/personnel who originally requested that the sample(s) be analyzed. Data shall be documented in such a manner as to minimize ambiguity, uncertainty, and/or loss. Hard copies and/or electronic media copies of all analytical data will be maintained for 40 years. All hard copy data will be handled as described in Section 4.7. Electronic storage of data will be maintained where possible.

4.14.2.1 Sample Management

The Sample Team enters the samples into the LIMS and prints labels and a Scratch Log (internal chain of custody). Then physically transports the samples to the lab (or MAP for field operations) for analysis. The scratchlog is signed and dated by person receiving the samples to indicate receipt of samples for analysis. The Sample Team retains the Scratch Log as a record of delivery/receipt. If samples are received too late on a given day for analysis to be completed, the AT will preserve the samples (see Section 4.11) and perform analysis as soon as possible. Samples shall be analyzed within five working days of receipt. Sample results are posted in the LIMS, and logged on the Daily Report (via the Excel spreadsheet or if not available, the Daily Report form). A Data Sheet report is generated from the LIMS and submitted with the data packet to senior level personnel and the QAC for validation.

The above procedure is followed during field operations with the exception that the data is not submitted to the QAC for validation prior to release of results.

4.14.3 Delivery

Samples are immediately transported by ST to the Monitoring Branch for analysis at USAECBC or to the point of analysis in field operations. Flow rates for each sample are recorded on the AIR SAMPLES WORKORDER (MBFORM-39). Sample labels and field labels accompany the samples to the laboratory for analysis. The sample custodian, the QAC, or an analyst verifies receipt of the samples by signing and dating the chain of custody at the bottom of the scratchlog. The official copy of the scratchlog is returned to the Sample Team for filing.

All data that are results of a monitoring operation shall be handled IAW approved procedures (See Section 4.4).

4.14.4 Analysis

a. GC Analysis:

After completion of a successful calibration exercise or performance check, the analyses of actual samples may begin. This will be done in accordance with approved IOPs and SOPs. These IOPs and SOPs are shown on the Master List of Documents.

Sample analysis shall be done by certified personnel using certified instruments. The analyst shall document the following information on the daily report:

- Instrument number
- Analyst name or initials
- Analysis date
- Batch number
- Sample ID number
- Tube number
- Analytical run number
- Analytes of interest
- Sample analysis results
- QC sample results, including percent recovery
- Retention time (if required)

Analytical results of both field and QC samples shall be included in the documentation. The analyst shall upload these results to the LIMS where the data will be reviewed and approved by authorized personnel and sample results sent to the appropriate POC.

Field Operations- The analyst shall document the same information as in the above paragraph on the EXCEL daily report or MBFORM 5 except as noted below:

Replace "Batch Number" with "Site Extension Number"

The results of the analyses of both real and QC samples shall be included in the documentation. Sample results are stored in the MAP computer. The analytical results are entered in the field LIMS program and the data sheet report is generated. Analytical results are reviewed by authorized personnel and reported to personnel specified by the site safety plan.

b. MINICAMS Monitoring:

After completion of a successful calibration exercise monitoring may begin. The operator shall document the following information on the QC Data Sheet (MBFORM-4) in accordance with the appropriate IOP requirements:

- Operator initials
- Date
- Time
- Cal Height
- Found Concentration
- Corrective actions
- Location
- Monitor I.D.
- Agent
- Flow Rate Check

4.14.4.1 Confirmation Of Positive Responses

See IOP-MT-13 or MT-19 for specifics.

If the first tube analyzed on the GC/FPD has a result ≥ 1.0 AEL for VX, or if the response for VX is greater than the calibration range, the second tube is analyzed on a GC/MSD or on a GC/FPD with a column of differing polarity from the first run and the ChemStation data reports are placed in the data packet from each GC respectively. A note is made on the bottom of the report page for the second GC noting the GC number and the date that the first tube was run.

During duty hours, confirmation samples are collected during fixed-site MINICAMS operations within 20 minutes of a suspected positive result or at the request of the customer. During non-duty hours, confirmation sampling will begin as soon as possible.

During mobile NRT operations, concurrent samples are collected using MINICAMS and DAAMS tubes. The DAAMS tube samples are used to confirm suspected positive MINICAMS responses. On-Off times are used to calculate expected TWA level for confirmation. Conversely, the minimum sample time can be calculated to determine how to set up the DAAMS tubes for confirmation.

NON-ROUTINE MONITORING--During non-routine NRT monitoring operations, concurrent samples are collected using MINICAMS and DAAMS tubes. The DAAMS tube samples are used to confirm suspected positive MINICAMS responses. Two different NRT monitoring methods may also be used for non routine monitoring.

4.14.4.2 Correction for Method Recovery

For samples that have been confirmed for the presence of agent, the found concentration shall be corrected for method recovery. The method recovery is calculated as follows:

$$r = \frac{J}{T_c}$$

where:

r is the method recovery

J=Lowest QP for sample type.

T_c is the target concentration of the 1 AEL (4 µl) QP samples

After the method recovery is calculated, found concentrations are corrected as follows:

$$CC = \frac{FC}{r}$$

where:

CC is the corrected concentration for non-QC samples

FC is the found concentration in non-QC samples

r is the method recovery from QP samples

The corrected concentration is the best estimate of the true vapor concentration and shall be the value reported to the necessary organizations.

4.15 Quality Records

Records shall be generated using permanent ink and maintained to support and substantiate all quality related activities. These records shall provide evidence of the quality of the analytical data and compliance with the specified requirements. Analytical results will be identified by sample ID number, date, instrument ID number and/or batch number.

Records shall be stored in a manner to minimize deterioration or damage and to prevent loss and unauthorized use. Electronic records shall be kept in the LIMS and electronic databases; hardcopy records shall be kept in Monitoring Branch files until they are scanned and put on CD's. See 4.4.3 above.

The LIMS data are "backed up" on tape every business day and the backup tapes are taken to a separate location twice monthly for storage.

The DD Form 1911 accompanying the CASARM standard ampoules received from the CTF will be placed in the 1911 Binder. When the CASARM standard is used to prepare working standards, what is not used to prepare the standard is immediately decontaminated. A DD Form 1911 is prepared and stored in the 1911 Binder for the working standards. An entry is made in the Accountability Logbook on a CSM Custodial Stock and Usage Record (MBFORM-15) when a working standard is prepared and when working standards are issued to analysts/operators. MBFORM-15 states the quantity of each working standard dispensed and the quantity remaining. An entry is also made on a Record of CSM Destruction (MBFORM-14) in the Accountability Log when working standards are destroyed. These logs are stored at the Monitoring Branch.

The following information is maintained in the Agent Prep Logbook (also called Standards Logbook) for working standards:

- Preparation date
- Agent identity
- Name of preparer
- Lot number of the standard
- Concentration of the standard
- Solvent type
- Solvent purity
- Solvent lot number
- Total volume of the standard

Each vial of working standard is also labeled with the following information:

- Preparation date
- Agent identity
- Initials of preparer
- Standard number
- Agent concentration
- Solvent type
- Expiration date

The Standard Number provides traceability from the working standard back to the CASARM-certified standard. The number has the following structure:

Standards Logbook (roman numeral) – Page number – Entry number

For example, the preparation of Standard III-81-1 is described in the third Standards Logbook, and is the first entry on page 81.

The Standard numbers, preparation date, expiration date and initials of person preparing the standard are also stored in the LIMS.

GC Calibration data will be stored on the LIMS and documented in the analytical package. MINICAMS calibration data are stored electronically in the Mini-Link and are recorded on the MINICAMS QP Data Sheet (MBFORM-4), which are stored in the Monitoring Branch or long-term storage.

All major instrument repairs will be noted in a log that will be kept for each laboratory instrument. Each instrument shall have its own logbook. This logbook shall contain the following types of information:

1) Instrument manufacturer, model number and serial number
2) Site specific instrument ID number (if applicable)
3) Date instrument was received (if known).

All data stored electronically at the Monitoring Branch are backed up on disks, tape, or CD, and made part of the 40-year record maintenance system.

4.16 Internal Quality Audits

The Chief of the Monitoring Branch shall annually initiate an internal audit of the entire Quality Management System (QMS) to assess the effectiveness of the QMS and to identify opportunities for improvement. Findings will be reviewed for necessary corrective actions. The auditors will use check sheets to record audit findings and corrective action request(s) (CAR) to specify corrections required to bring the system into conformance. All necessary actions will be taken by management to expeditiously eliminate detected nonconformities and eliminate their causes. Personnel performing the internal audit will be trained in the auditing process. Auditing personnel will not audit their own areas of performance. A record of this review/audit shall be maintained.

Audits shall include an evaluation of the following:

a) Activities, work areas, and work and services being generated by Monitoring Branch personnel and its contractor which relate to chemical agent air monitoring.
b) Quality practices and procedures as they relate to CASARM requirements.

c) Certification, documentation, and records

d) Recommendations/findings of previous audits.

e) Review of completed and outstanding CARs.

f) Review of purchasing documentation.

The following information shall be recorded concerning the internal audits:

Date of the audit

Name of the auditor

Recommendations/findings of the audit

Checklist or inspection sheet used for the audit

Date and findings of any follow-up audits

The Chief of the Monitoring Branch shall review audit results, implement and document corrective actions required to correct and prevent a recurrence of the deficiency. The QMS will be updated by incorporating necessary changes resulting from deficiencies/corrective actions into quality documents as required to maintain the integrity of the QMS.

All action taken to correct deficiencies shall be reviewed to verify compliance and effectiveness and a closeout report issued.

4.17 Training

4.17.1 Individual Training Plans

Personnel performing assigned tasks are qualified on the basis of appropriate training, education and/or experience as required. All Monitoring Branch personnel will have an individual training plan that is tailored to each type of operation performed by that individual. These training plans may be in the form of check sheets, written procedures, or a combination of both. In any case, the plans will document that the individual has completed the required training in a satisfactory manner and will be signed by both the trainee and the trainer. A copy of the individual training plan and evidence of successful completion of training will be filed in each employee's training file.

Individual Training Plan

Monitoring Branch Individual Training, as outlined below, includes requirements to provide training for:

- GC/FPD & GC/MSD analysts/operators
- MINICAMS operators

- Sample Technicians.

Analysts and Operators: Analysts and Operators for GC/FPD and GC/MSD will be trained/certified IAW requirements outlined in "GC Certification Checklist" (MBFORM-7). This completed checklist will provide objective evidence of satisfactory completion of "on-the-job" (OJT) training and will be signed by the trainer and trainee.

MINICAMS Operators: MINICAMS Operators will be trained/certified IAW requirements outlined in "Checklist for Certification of a MINICAMS Operator" (MBFORM-8). This completed checklist will provide objective evidence of satisfactory completion of OJT training and will be signed by the trainer and trainee.

Sample Technicians: Technicians will be provided OJT and certified IAW requirements outlined in Sample Technician Training Checklist (MBFORM-48). This completed checklist will provide objective evidence of satisfactory completion of OJT training and will be signed by the trainer and trainee.

Satisfactory completion of other required/specialized training shall be demonstrated/documented by methods such as:

a) Examination

b) Testing

c) Certification

d) Letter/record of attendance

New sample technicians shall be trained in established procedures by experienced sample technicians or the STL. The procedures are detailed in SOPs, IOPs, and/or check sheets.

Analysts are certified IAW the following subsections.

4.17.1.1 Analyst/Operator Certification

The analyst must demonstrate proficiency in conducting chemical analyses prior to becoming certified to analyze samples. The first phase of the analyst certification involves instruction in the methods of analysis, covering both theoretical concepts and practical considerations. The instruction shall include, but not limited to, the items in the appropriate checklist (MBFORM-7 or 8, as appropriate). The instructor shall sign and date each checklist completed by the individual indicating that the training was received and comprehended.

The second phase of certification involves successful completion of a precision and accuracy (P&A) study or certification test. A P&A study or certification test begins with the analysis of synthetic samples whose analyte concentrations are known. P&A or certification test

samples used in certification of an analyst can be either QP or QL samples. The analyst/operator must pass a P&A study or certification test for each method or monitor that he/she shall be using.

The types of certification tests are outlined in the following subsections.

4.17.1.1.1 Type 1 Methods/Monitoring Tasks

The certification test for Type 1 methods and monitoring tasks requires the candidate to perform an instrument calibration then perform two days of QL or QP analyses. For two (preferably) successive days, each candidate will challenge an instrument or monitor with two samples at each level of 0.25 AEL, 1.0 AEL and 1.5 AEL. If one of the twelve samples in the personnel certification test is not within acceptable limits, an additional three sample-set challenge must be performed. The analyst is certified if all three re-samples are within acceptable limits. The analyst must repeat the entire twelve-sample certification test if more than one sample of the twelve original samples are outside the limits and if one of the re-analyzed samples is not within acceptable limits. Monitoring Branch personnel use Q L's for Type 1 DAAMS certification and QP's for MINICAMS certification.

Acceptance criteria: QL's ± 15% for 1.0 & 1.5 AEL. ± 50% for 0.25 AEL.
Acceptance criteria: QP's ± 25% for 1.0 & 1.5 AEL. ± 50% for 0.25 AEL.

Both the training and the assessment of proficiency of the analyst/operator trainee will be the responsibility of the Team Leader. However, the Team Leader may, if desired, delegate all or part of this responsibility to another analyst/operator who is already certified for performing the analysis/monitoring task.

4.17.1.1.2 Semi-Annual Evaluation of Personnel.

The competency of individuals performing type 1 methods/monitoring tasks shall be evaluated semi-annually by having each analyst or operator analyze a blind sample(s) for all Type1 methods for which the individual is certified. Individuals whose analytical data meet the specified acceptance criteria specified above (see 4.17.1.1.1) remain certified. Individuals whose analytical data fails to meet specified criteria above (see 4.17.1.1.1), will be required to take the 2'day re-certification test specified in 4.17.1.1.1.

4.17.1.1.3 Type 2 Methods

The certification test for Type 2 methods will consist of analyzing three QP samples at the lowest standard for two, preferably consecutive, days.

The analyst is certified if a detectable signal at or above a 3:1 signal to noise ratio is obtained for all six samples for each of the methods. In addition, all candidates shall also complete the requirements outlined in the Certification Checklist (MBFORM-7 or 8, as appropriate).

4.17.1.2 Re-certification of Analysts/Operators

4.17.1.2.1 Type 1 Methods/Monitoring Tasks

Recertification of analysts and operators is based on demonstrated proficiency on an instrument or monitor, not on proficiency in performing specific methods or monitoring tasks. An individual who has not used a Type 1 instrument/monitor for six months shall be trained and certified as outlined in Sections 4.17 and 4.17.1.1.1 before using the instrument or monitor. An individual who has not used a Type 1 instrument/monitor for two calendar months shall read the appropriate procedure or SOP, document that it has been read, and analyze two QP or QL samples at each level of 0.25 AEL, 1.0 AEL and 1.5 AEL. The analyst/operator is re-certified if the FC's meet requirements below:

Acceptance criteria: QL's ± 15% for 1.0 & 1.5 AEL, ± 50% for 0.25 AEL.
Acceptance criteria: QP's ± 25% for 1.0 & 1.5 AEL, ± 50% for 0.25 AEL.

4.17.1.2.2 Type 2 Methods

An individual who has not used a Type 2 instrument or monitor for more than one year shall be trained and certified as outlined in Sections 4.17 and 4.17.1.1.3 before using the Type 2 instrument or monitor. An individual who has not used a Type 2 instrument or monitor for longer than six months shall read the appropriate procedure or SOP, document that it has been read, and analyze three samples at the confirmation and/or reporting level. All three samples must be detectable at or above a 3:1 signal noise ratio to obtain a successful re-certification. An individual who fails to meet the criteria shall perform a certification test as outlined in Section 4.17.1.1.3.

4.17.1.3 Sample Collection Personnel

Sample collection personnel shall receive a period of training followed by hands on instruction in the appropriate collection procedures. The training and instruction shall be documented. In addition to the initial training and instruction, sample collection personnel shall read and sign the appropriate SOPs and IOPs as required. Sample collection personnel who have not collected a sample in 12 months shall be re-trained prior to collecting samples.

4.17.2 P&A Certification of Type 1 Methods/Monitors

The first step in the P&A process is to document the method in accordance with Appendix A of the CQAPCAAM. Only trained analysts or operators shall analyze P&A study samples and certify methods. The P&A study for Type 1 methods or monitors consists of analyzing ten **QP** agent challenges on four (preferably consecutive) days. **The QPs will be collected/handled as specified in the appropriate IOP. e.g. IOP-MT13.** A solvent blank shall be analyzed on the first day of analysis. The ten daily P&A samples shall be two samples at

each of the five concentrations: 0.25 AEL, 0.5 AEL, 0.75 AEL, 1.0 AEL, 1.5 AEL, where AEL is the applicable hazard level. The data shall be evaluated by pooling all four days of data into a single group and performing a linear-regression analysis of found concentration (FC) versus target concentration (TC). The computer software used to calculate the P&A study detection limits has been supplied by the CQAT.

The method shall pass the P&A study and the analyst and the instrument shall be certified if the following conditions are met:

a) The Target Action Level (TAL) is greater than the lowest calibration standard (LCS), as calculated by the P&A software.

b) The Uncertainty in Found Mass (UIFM) is less than or equal to ±25%.

4.17.3 Certification of Type 2 Methods/Monitors

Methods certified as Type 1 do not require further certification to be used as Type 2.

The first step in the P&A process is to document the procedure in accordance with Appendix A of the CQAPCAAM. Only trained analysts or operators shall analyze P&A samples. Certification of Type 2 methods will be performed by analyzing two blanks and eight QP samples at the confirmation/reporting level on each of two different (preferably consecutive) days. The method will be certified if 100% of the challenges yield a detectable response at or above the 3:1 signal to noise ratio and 100% of the blanks do not yield a response.

4.17.4 Certification of Additional Instruments

For Type 1 methods, additional instruments/monitoring systems will be certified by having a certified operator calibrate the instrument in accordance with specified procedures, then challenge the instrument with duplicate QL or QP challenges of 0.25 AEL, 1.0 AEL and 1.5 AEL on each of two different (preferably consecutive) days. If one of the twelve samples in the instrument certification test is not within acceptable limits, an additional three sample-set challenge must be performed. The instrument is certified if all three re-samples are within acceptable limits. The analyst must repeat the entire twelve-sample certification test if more than one sample of the twelve original samples are outside the limits or if one of the re-analyzed samples is not within acceptable limits.

Acceptance criteria: QL's ± 15% for 1.0 & 1.5 AEL & ± 50% for 0.25 AEL.
Acceptance criteria: QP's ± 25% for 1.0 & 1.5 AEL & ± 50% for 0.25 AEL.

Instruments/monitors used for Type 1 methods that have undergone extensive repair or have not been used for longer than six months require re-certification. These instruments will be re-certified by generating an acceptable calibration curve and QL (for laboratory instruments) or QP (for MINICAMS) results. Instruments/monitors that fail to meet these requirements shall be tagged for repair or replacement.

The certification of additional instruments used for Type 2 methods consists of a trained analyst performing the analysis of three QP or QL sample at the level which the organization is required to confirm and/or report values and one blank on each of two preferably consecutive days. To pass the certification test, a detectable signal at or above a 3:1 signal to noise ratio shall be obtained for all six samples and the blanks must yield no response.

4.17.5 Significant Changes in Methods/Monitoring Tasks

The following items are significant changes in a method/monitoring task and require the performance of a new P&A study as described in Sections 4.17.2 and 4.17.3.

- A change in the volume of the air sample collected only if the volume collected would theoretically contain an amount of agent that is less than the lowest standard or greater than the highest standard used during the original P&A study, based on the mass of agent equal to the AEL.
- A change in the type of media used to collect the sample.
- A change in the type of liquid (stationary) phase in a GC column.

4.18 Statistical Techniques.

Monitoring Branch shall use the statistical programs that are provided by the CQAT for verifying the acceptability of process capability and product characteristics.

The program software furnished by CASARM will be used as the comparison/transfer standard to verify in-house developed and/or software used by the Monitoring Branch.

In-house developed software/database will be evaluated and verified for adequacy by using a standard set of numbers. These standard numbers will be input into both the CASARM software and the in-house software. The resulting output data will become a part of the verification package that includes: Program Identification, Authors name, Date of Issue, Revision number, Data used for verification, and Program output. No special signature authority is required since acceptable data comparison with CASARM furnished program is proof that the programs are in conformance with requirements. The person performing the verification will sign or initial and date the verification data to indicate that the programs are acceptable.

4.19 Preventive Maintenance

Scheduled preventive maintenance (PM) is not required on the new GCs & MSDs by the instrument manufacturer. Instrument maintenance is performed as required for optimum instrument operation by monitoring branch personnel. Each instrument has a logbook that is unique to that instrument and all maintenance/repair performed on that instrument is documented

in the logbook. The person performing routine maintenance shall initial and date the logbook entry.

Monitoring Branch has a service contract for non-scheduled instrument repair and maintenance with an instrument vendor. The contract also requires a once per year PM for each instrument covered by the contract.

Monitoring Branch maintains a contract with the manufacturer of the MINICAMS to perform PM on MINICAMS on a regularly scheduled basis IAW with their requirements. Each MINICAMS is tracked by CMS using individual stickers that contain current PM date and next scheduled PM due date. The current MINICAMS PM schedule is every 6 months. The contract requirements are the written procedure.

4.20 Reference Materials

Working Standard Solutions. **Two sets of working standards will be prepared.** Working standards are prepared by serial dilution of dilute CASARM solutions in accordance with SOP#CR4-2NP016, Preparation of Near Drinking Water Level Chemical Agent Standards.

If CASARM grade agent is unavailable, the best available agent material is obtained from the CTF or from the Client for use in making working standards.

At a minimum, reagent grade organic solvents shall be used to prepare all standard solutions. Each solvent lot used shall be evaluated to determine that an adequate amount of the solvent lot is available to complete the task. Organic solvents must be kept as water free as possible while in use. Minimum information on the label attached to the solution container is agent name, solvent name, concentration and date prepared or expiration date.

For each serial dilution, the following information shall be recorded:

- Agent name
- Solution concentration
- Solvent name
- Solvent grade
- Solvent manufacturer
- Solvent expiration date (if applicable)
- Date of solution preparation
- Expiration date of the solution
- Name of preparer
- Identity of the stock solution used to prepare the dilution

Working solutions have a shelf life of up to 6 months and are prepared as needed.

Working standards shall be stored below 4°C. The temperature of the refrigerator shall be recorded monthly. CQAT will be notified if refrigerator temperature is above 4° C for more than 96 hrs. Operations with CASARMs outside cold storage will be kept to a minimum.

The Branch Chief or his designee will arrange for a supply of necessary reference materials, such as CASARM or best available standard.

The ATL will specify which reference materials are acceptable for use in a given procedure.

4.20.1 Glassware cleaning procedure

Extractions and sample preparations involve the use of disposable items.

Standards are made using volumetric glassware that is re-used. These volumetrics are washed using "Alconox", "Sparkleen", or their equivalents. The glassware is rinsed with tap water, de-ionized water, then Methanol. The glassware is allowed to air dry and is then put away.

4.21 Action Level

Analytical results exceeding the actions levels in the following tables (Tables 1, 2, and 3) shall be reported to the Chief of the Monitoring Branch as soon as possible.

Table 1. Required Action Levels for Air Monitoring Program DAAMS Tubes
(Based on Specified Sampling Parameters)

	Sampling Parameters			
Agent	Allowable AEL* (mg/m3)	Sample Volume (l)	Required Action Level** (ng on the tube)	Concentration of Agent in the Calibration Standard (µg/ml)

GA, GB, GF	.0001	24	2.40	0.60
GD	.00003	24	0.72	0.18
VX	.00001	24	0.24	0.06
HD**, L**	.003	24	72.0	18
HN-1**, HN-3**	.003	24	72.0	18

* Time Weighted Average for 40-hour workweek
** Due to instrument sensitivity, standard concentrations of these analytes are lower, typically 1-2 ug/ml or ng/ul.
*** Required Action Level Calculation:

Required Action Level Calculation:

$$D(ng) = \frac{A\ (mg)}{m^3} \times \frac{m^3}{1000\ l} \times \frac{1000\ (\mu g)}{(mg)} \times \frac{B\ (l)}{(min)} \times C\ (min) \times \frac{1000\ (ng)}{(\mu g)}$$

Where: A = AEL
B = Flow rate
C = Sampling Interval
D = Required Action Level

Table 2. Required Action Levels for Air Monitoring Program

Fixed-Site HPD Systems (N-field)
(Based on Specified Sampling Parameters)

Agent	Allowable AEL* (mg/m3)	Sampling Interval (min)	Flow Rate (l/min) (tube)	Required Action Level** (ng on (ug/ml)	Concentration of Agent in the Calibration Standard
GB	0.0001	10	1.0	10	0.25
GD	0.00003	10	1.0	0.3	0.075
VX	0.00001	10	1.0	0.1	0.025
HD	0.003	10	1.0	30	7.5

* Time Weighted Average for 40-hour work week.
** Required Action Level Calculation:

$$D(ng) = \frac{A\ (mg)}{m^3} \times \frac{m^3}{1000\ l} \times \frac{1000\ (\mu g)}{(mg)} \times \frac{B\ (l)}{(min)} \times C\ (min) \times \frac{1000\ (ng)}{(\mu g)}$$

Where. A = Allowable AEL

B = Flow rate

C = Sampling Interval

D = Required Action Level

Table 3. Required Action Levels for Air Monitoring Program
MINICAMS
(Based on Specified Sampling Parameters)

Agent	Allowable AEL* (mg/m3)	Sampling Interval (min)	Flow Rate (l/min)	Required Action Level** (ng on the tube)	Concentration of the agent in the calibration Standard (µg/ml)
GA, GB, GF	0.0001	3	0.8	0.24	0.06
		8	0.8	0.64	0.16
GD	0.00003	3	0.8	0.72	0.18
		8	0.8	0.192	0.48
VX	0.00001	3	0.8	0.24	0.006
		8	0.8	0.64	0.016
HD	0.003	3	0.4	3.6	0.9
		6	0.4	7.2	1.8
L	0.003	6	0.4	7.2	1.8
HN-1, HN-3	0.003	3	0.4	3.6	0.9
		6	0.4	7.2	1.8

* Time Weighted Average for 40-hour work week.

** Required Action Level Calculation:

$$D(ng) = \frac{A\ (mg)}{m^3} \times \frac{m^3}{1000\ l} \times \frac{1000\ (\mu g)}{(mg)} \times \frac{B\ (l)}{(min)} \times C\ (min) \times \frac{1000\ (ng)}{(\mu g)}$$

Where: A = Allowable AEL

B = Flow rate

C = Sampling Interval

D = Required Action Level

LIST OF ACRONYMS

Acronym	Definition
ADAM	Agilent Dynatherm Agent Monitor
AgF	Silver Fluoride
AMC	**U. S. Army Materiel Command**
ANSI	American National Standards Institute
APG	Aberdeen Proving Ground
AQL	Acceptable Quality Level
AR	**Army Regulation**
ASQC	American Society for Quality Control
AT	Analytical Team
ATL	Analytical Team Leader
ATTF	**Agent Testing Task Force**
CAR	Corrective Action Request
CARC	**Chemical Agent Resistant Coating**
CASARM	Chemical Agent Standard Analytical Reference Material
CHPPM	Center for Health Promotion and Preventive Medicine
CQAT	CASARM Quality Assurance Team
CQAPCAAM	CASARM Quality Assurance Plan for Chemical Agent Air Monitoring
CRL	Certified Reporting Limit
CSM	Chemical Surety Material
CTF	Chemical Transfer Facility
CW	**Chemical Weapon**
DA	**Department of Army**
DAAMS	Depot Area Air Monitoring Systems
DHHS	**Department of Health and Human Services**
DL	**Detection Limit**
DOD	**Department of Defense**
EAICF	Edgewood Area Internal Calibration Facility
ECD	Electron Capture Detector
ERDEC	Edgewood Research, Development and Engineering Center
FAL	Found action level
FC	Found (or measured) concentration
FPD	Flame-photometric detector
GC	Gas chromatograph, gas chromatography
GPL	General population limit
HL	Hazard level
HPD	Hewlett Packard Dynatherm System
HSL	Heated sample line

IAW	In accordance with
ID	Identification
IDLH	Immediately Dangerous to Life and Health
IOP	Internal Operating Procedure
ISO	International Organization for Standardization
LCL	Lower control limit
LCS	Lowest Concentration Standard
LIMS	Laboratory Information Management System
LLC	Low Level Challenge
LPL	Lower performance limit
MAP	Mobile Analytical Platform
MARKS	Modern Army Record Keeping System
MB	Monitoring Branch
MINICAMS	Miniature Continuous Air Monitoring System
MSD	Mass Selective Detector
MT	MINICAMS Team
MTL	MINICAMS Team Leader
NIOSH	National Institute for Occupational Safety and Health
NIST	**National Institute of Standards and Technology**
NRT	Near Real Time
P&A	Precision and accuracy (study)
PCT	Preconcentrator tube
PM	Preventive Maintenance
POC	Point of contact
PTP	**Proficiency Test Program**
QA	Quality Assurance
QAC	Quality Assurance Coordinator
QC	Quality Control
QL	Quality-Laboratory Sample (QC sample prepared in the laboratory)
QP	Quality Process Sample (QC sample prepared in the laboratory then aspirated with ambient air)
RDT&E	Research, development, testing and evaluation
RTM	Real Time Monitor
SBCCOM	Soldier, Biological, Chemical Command
SCBA	**Self contained breathing apparatus**
SOP	Standing Operating Procedure
ST	Sample Collection Team
STEL	Short term exposure limit
STL	Sample Collection Team Leader
TAL	Target action level
TC	Target (or true) concentration
TMDE	**Testing and Measuring Diagnostic Equipment**
TWA	Time Weighted Average
UCL	Upper control limit

UIFM	Uncertainty in the found mass
UPL	Upper performance limit
USAPMCD	**U.S. Army, Program Manager for Chemical Demilitarization**
USAECBC	U.S. Army Edgewood Chemical Biological Center
WPL	Worker population limit
XSD	Halogen Specific Detector
Z	Hazard Level

STANDING OPERATING PROCEDURE

Building(s): E2188

(check all that apply)

___Chemical Agent
___Biological/Toxin
___Radiation
___Lasers
___Industrial
___Pyrotechnic
_X_other (Potential CSM exposure)

ECBC
CB Services Directorate

Title: Personnel Decontamination Station

SOP#: CR4-0NP019

Submitted by:

Dennis G. Hall
Chief, Applications Integration Branch

Environmental Quality Office: _____

Risk Reduction Office: _____

Approved by:

_____
Director

Approval Date: _____

Prepared by: Dennis G. Hall/AMSSB-RCB-CA

DEPARTMENT OF THE ARMY
U.S. ARMY EDGEWOOD CHEMICAL BIOLOGICAL CENTER
ABERDEEN PROVING GROUND, MARYLAND 21010-5424

STANDING OPERATING PROCEDURES
PERSONNEL DECONTAMINATION STATION

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SUPERVISOR'S STATEMENT

1. The supervisor will sign this statement:

   a. When first assigned as supervisor of the hotline.

   b. When an approved change is made to the SOP.

   c. Annually.

2. I have personally reviewed each of the operational steps of the Standard Operating Procedure (SOP) and have no question in my mind that the operation can be performed safely and efficiently and in compliance with procedures noted in the SOP.

3. I have verified to my satisfaction that operators have been trained and are capable of performing their part of the operation in a safe and efficient manner, and have instructed them to follow the SOP without deviation.

4. Personnel that are assigned to this operation have been informed of the hazardous materials to which they may be exposed to and where the Material Safety Data Sheets are located.

5. In the event of a serious incident, I will notify the Project Officer immediately.

7. Following initial emergency notifications, I will report all injuries and accidents to the Safety Office and my supervisor.

SUPERVISOR'S SIGNATURE	DATE

OPERATORS' STATEMENT

1. The operator will sign this statement:

   a. When first assigned the operation.

   b. When an approved change is made to the SOP.

   c. Annually.

2. I have read or have had read to me, and understand the general and specific safety requirements, security requirements, and the work description necessary to accomplish my operation.

3. I have been thoroughly trained in, and am familiar with my part of the operation and I agree to abide by these instructions throughout my assignment to the operation.

4. I have been informed of the hazardous materials to which I may be exposed and where the Material Safety Data Sheets are located.

5. In the event of a serious incident, I will notify the Project Officer immediately.

6. I understand that in the event of an injury or sickness while performing my assignment, I will immediately notify my supervisor.

OPERATORS' SIGNATURE	DATE

GENERAL SAFETY REQUIREMENTS

SOPS:

1. Specific safety requirements are provided in the body of this SOP where those requirements apply.

2. Supervisory personnel shall maintain complete copies of the PDS SOP and will be responsible for the enforcement of its provisions during a hot line operation.

3. There will be no deviation or change from the approved SOP without prior approval of the ECBC Risk Reduction Office.

4. Any defect or unusual condition noted that is not covered by this SOP will be reported immediately to the Hot Line Supervisor.

SUPERVISOR DUTIES:

1. The supervisor is responsible to report to the safety officer and Command Post Officer (CPO), all injuries and accidents occurring during his/her escort.

2. The supervisor will be responsible for ensuring that the user inspects agent protective equipment. Protective clothing and masks used on a daily basis will be cleaned and inspected before operations. One inspection per month will be annotated on the "Monthly Mask User Inspection" card. Where masks are used for emergency escape only, (observers and inspectors) these will be inspected monthly (by the user) and will be annotated on the "Monthly Mask User Inspection" card.

3. All spills (any chemical material), positive readings, or unusual events will be reported to the Hot Line Supervisor and Command Post Officer (CPO).

4. Care will be taken to limit exposure of a minimum number of personnel, for a minimum time, to a minimum amount of hazardous material consistent with safe and efficient operations.

5. Work not related to operations will not be performed in the areas of agent operations.

6. At the beginning of each operation, the Hot Line Supervisor will assemble the Team Members and provide a briefing on the operations to be performed, and special clothing or equipment required.

7. At the end of each operation, the Hot Line supervisor will assemble all Team Members to discuss the day's events. The supervisor through discussion will identify any equipment problems, defects, or other safety issues.

PROTECTIVE CLOTHING/ EQUIPMENT:

1. Protective clothing requirements are provided in Chapter 4 of this SOP.

2. Personnel down range will keep their protective mask within arms length if not being worn.
3. To ensure an airtight fit of protective masks, all hot line personnel will report for work each day with clean faces. A mustache that does not interfere with functioning of the mask is acceptable.
4. Each time an individual dons a protective mask/respirator, the following fit checks must be preformed to ensure a satisfactory face fit:

a. Place palm of hand over the exhalation valve and exhale gently into the face piece. The face fit is considered satisfactory if a slight positive pressure can be built up inside the face piece without any evidence of outward leakage of air at the seal.

b. Close off the inlet opening of the canister by covering with the palm of the hands. Inhale gently so the face piece collapses slightly and hold the breath for 10 seconds. If the face piece remains in its slightly collapsed condition and no inward leakage of air is detected the seal of the respirator is considered satisfactory.

5. Protective clothing and masks used on a daily basis (toxic handlers, inspectors, etc.) will be cleaned and inspected before each operation (by the user). One inspection per month will be annotated on the "Monthly Mask User Inspection" card. When masks are used for emergency escape only (observers and inspectors), these will be inspected monthly (by the user) and will be annotated on the "Monthly Mask User Inspection" card. The inspection will consist of the Preventive Maintenance Checks and Services (PMCS) as outlined in TM 3-4240-346-10. Immediately report any defect to your supervisor.

6. Operators while wearing a protective mask will wear no contact lenses. Individuals requiring visual correction will utilize approved prescription lenses. Visitors wearing a mask for escape purposes only may wear contact lenses.

7. Protective masks/respirators should be stored in a cool dry place and should be protected against dust, sunlight, heat, extreme cold, excessive moisture, damaging chemicals, and mechanical damage.

8. Personnel wearing impermeable protective clothing that has not been NFPA approved must avoid contact with open flame or objects that could ignite the clothing since the clothing will burn and does not possess self-extinguishing properties.

9. Primary means of communications will be by radio with telephone back up.

FIRST AID/ MEDICAL:

1. Prior to engaging in work involving possible exposure to chemical agent, personnel will report open sores and wounds of the skin to the supervisor who in turn pull the individual out of the operation.

2. During hotline operations, hotline team members will periodically observe one another for symptoms of agent exposure.

TOOLS/ EQUIPMENT/ MHE:

1. Prior to start of operations, the following inspections will be performed:

a. Motor vehicles will be inspected using the appropriate TM or operators manual.

b. When motor vehicles are used as cargo vehicles, inspect the vehicle using DD Form 626, Motor Vehicle Inspection.

2. Tools and supplies used in response to a chemical accident such as emergency decontamination, spill mitigations, site survey, containerization, etc. are identified in Appendix A of this SOP.

3. Employees will not tamper with any safety devices or protective equipment.

DECONTAMINATION:

1. Emergency first aid and decontamination procedures will be performed if personnel come in contact with liquid contamination.

2. All personnel coming in contact with CSM will wash their hands and face thoroughly before using the toilet or before eating or smoking. Eating and smoking will not be permitted during an operation.

3. Protective clothing worn in known agent contaminated areas will be decontaminated through a hotline process. Clothing will be double bagged and contents will be monitored. If results are negative, clothing may be sent to the laundry. If results are positive, sealed double bags will then be transported to a vapor containment area for further Airborne Exposure Limit (AEL) monitoring and decontamination.

SAFETY:

1. The following safety procedures will be followed during fueling operations:

   a. Fueling must be done only in designated area or at approved fuel points.

   b. Fueling shall only be done when equipment is not running.

2. Ensure that no eating, drinking of beverages, chewing or smoking materials will be permitted forward of the Contamination Control Line (CCL, see page 29 for diagram of PDS outline).

3. Work locations will be maintained in a neat and orderly condition.

4. Lifting shall be with the knees bent and the back straight in order that the thigh muscles may assume the greater portion of the load. If the object to be lifted is too awkward or too heavy to be handled in this position, additional help shall be obtained to move the load. Lifts shall be made vertically and close to the body. Side lifts or off balance lifts frequently result in muscle strains.

5. All team members have the authority and responsibility to stop unsafe operations where imminent danger is involved.

6. Individuals will receive and understand instructions in self-aid, first aid, and protective clothing and equipment on an annual basis as a minimum.

Chapter 1 -- GENERAL

1.1 PURPOSE: To establish procedures for the setup, operation, and closedown of the ECBC personnel decontamination station (PDS).

1.2 SCOPE: This SOP applies to all ECBC personnel responding to an accident/incident operation and working on the personnel decontamination station team.

1.3 POLICY: ECBC will maintain well-trained decontamination teams that are capable of providing personnel decontamination at all times.

1.4 GENERAL: Level C protective clothing is worn by PDS personnel. Personnel performing the four-point monitoring test will wear Level C clothing.

NOTE: The Safety Officer may change the level of protection worn by the PDS team with concurrence of Command Post Officer (CPO).

1.5 HAZARDS:

a. Chemical Agents: Refer to ERDEC-SP-058, Appendix C and individual MSDS for hazards of chemical agents.

b. Bleach: Sodium hypochlorite contains chlorine. Inhalation of fumes is to be avoided as it may cause respiratory irritation. Strong sodium hypochlorite solutions are powerful oxidizing agents that slowly produce burns when in contact with the skin. Inhalation may cause burns on mouth, throat and stomach.

c. Diesel fuel is a flammable liquid and has the following acute and chronic effects of exposure: EYES:MAY CAUSE IRRITATION.SKIN:REPEATED CONTACT MAY CAUSE IRRITATION.INGEST:MAY CAUSE GI TRACT IRRITATION.MAY CAUSE LUNG DAMAGE IF VOMITED AFTER SWALLOWING.INHAL:NO SIGNIFICANT HEALTH EFFECTS UNLESS HEATED.MAY IRRITATE RESPIRATORY TRACT.CHRONIC:MAY CAUSE KIDNEY DAMAGE.

1.6 EMERGENCY PROCEDURES

a. Refer to ERDEC-SP-058, Appendix J for standard emergency procedures.

b. Reporting Sequence:

(1) Dial 9-1-1.

(2) Team Leader.

(3) Division Chief.

(4) Risk Reduction Office (436-4411) within one (1) hour.

NOTE: After hours, minor incident reported the next day.

Chapter 2 -- PROCEDURES

2.1 EMERGENCY PERSONNEL DECONTAMINATION STATION (EPDS)

a. When responding to an agent accident/incident the Fire Department's Emergency Personnel Decontamination Station (EPDS) will process the initial casualties until ECBC personnel establish an EPDS or PDS. Primary emergency decontamination is restricted to agent exposures and medical casualties requiring expeditious transport to the medical treatment facility.

b. The Hot Line Supervisor will insure the PDS is set up in a clean area.

c. The ECBC PDS team will initially set up an EPDS. The EPDS will then expand to a full PDS as needed. Establish a gross-level area monitoring along the Contamination Control Line (CCL), if necessary (i.e., CAM). The PDS Team Leader will notify the CPO when the EPDS is established and continue to set up the PDS as needed.

d. Each member of the PDS Team will have his/her mask checked with the M41 by a certified operator prior to PDS operations.

e. The EPDS is designed for limited processing of a small number of individuals. When setting up an EPDS, the first items emplaced will be those that provide an immediate capability to decontaminate and evacuate casualties (stretchers, bleach, water, scissors, etc.).

NOTE: Individuals from ECBC or Fire Dept personnel wearing protective ensembles that include Self-Contained Breathing Apparatus (SCBA) are processed using the procedures in paragraph 2.3.

To decontaminate and evacuate casualties, the priority is to remove the individual from the ensemble while trying to avoid further contamination. Then, decontaminate and send the individual for medical treatment. (1) Remove PPE (2) Do not remove mask face piece (3) Decon individual (4) Pass over to cold side and wrap in a blanket (5) Transport to CCL, remove mask and hand casualty to medical personnel.

2.2 Processing Casualties through the EPDS:

a. Establish the Hotline.

b. The PDS team member on the "hot side" will spray, pour, or brush the protective clothing with decontaminant.

c. The PDS team member on the "hot side" will thoroughly scrub the individual in the protective suit from **head to toe** with hot soapy water.

d. The PDS team member on the "hot side" will thoroughly rinse the individual in the protective suit from **head to toe**.

e. Cut away the protective suit, and remove or cut away the boots and gloves. Remove clothing as fast and safe as possible without causing further injury.

f. Remove all clothing from the casualty, cutting off if necessary.

g. If a chemical casualty, decontaminate with household bleach (**.5% but do not bleach over the face**). If there is no bleach, use a large amount of clean water then **rinse well.** If a heat casualty, rinse with fresh water.

CAUTION
!!! There is no contact time for bleach on skin !!!

h. Pass the casualty over the LCL (see Appendix B) onto a stretcher on the clean side, and place a blanket over the casualty to maintain body temperature.

i. Take the casualty to the CCL and remove mask.

j. Once the casualty is turned over to medical personnel, check the cold side stretcher for contamination. If the stretcher is free from contamination return it to the LCL. If contaminated, place in double 6 mil clear plastic bag, seal with tape and mark the bag with the following:

(1) Name of the contaminant (agent).

(2) The date, time, and location.

(3) The word **CONTAMINATED** in large letters.

NOTE: Medics providing first aid to casualties in contaminated areas are not allowed to transport casualties to clinic without being decontaminated.

k. The casualty's clothing is placed in double 6 mil clear plastic bags, sealed with tape, and marked. Marking on the bag will contain the following information:

(1) Name of the contaminant (agent).

(2) The individual's name.

(3) The date, time, and location.

(4) The word **CONTAMINATED** in large letters.

2.3 Processing Personnel Through the PDS

2.3.1 Station 1 -- Equipment Drop.

a. Place all equipment used at the event site on the equipment drop cloth or in the equipment drop container. Gross-level monitor all equipment that must cross the LCL (i.e., containerized munitions), by the PDS Team at the LCL. The PDS team leader has the responsibility for security of the equipment. Check equipment with a low level monitor (MINICAMS) before proceeding across the LCL. If no low level monitoring equipment is available or the contamination is not detected (e.g. Lewisite, Phosgene, etc.) then the equipment is processed through the decon line to ensure contamination is reduced to as low a level as possible.

b. All weapons from MPs and Security Guards are put into a 6-mil clear plastic bag and observed by security personnel.

c. Classified documents are put into clear plastic bags, monitored and if clean, transported to a secure location.

2.3.2 Station 2 -- Shuffle pan.

a. Contaminated individual steps into the sump pan and shuffles the liquid (bleach) over each boot (or boot cover).

b. Scrub the boot thoroughly with a brush (Pay particular attention to the under sole of the boot).

2.3.3 Station 3 -- Outer Garment Decon.

a. Contaminated individual steps into the sump pan for decon.

b. PDS team member will spray or pour the protective clothing with decontaminant (ensuring not to wet M40 filter if worn).

2.3.4 Station 4 -- Detailed Outer Garment Wash.

a. Step into the sump pan for outer wash.

b. The PDS team member will thoroughly scrub the individual in the protective suit from **head to toe** with hot soapy water (ensuring not to wet M40 filter if worn).

2.3.5 Station 5 -- Detailed Outer Garment Rinse.

a. Contaminated individual steps into the next sump pan.

b. PDS team member thoroughly rinses the individual in the protective suit from **head to toe** with clean water (ensuring not to wet M40 filter if worn).

2.3.6 Station 6 -- Monitoring. PDS team member checks personnel with the CAM, M90, and/or M8 paper for any possible remaining contamination. Return to station 3 and reprocess through to station 6 if contaminated.

2.3.7 Station 7 -- Outer Garment Removal.

a. Processed personnel will doff their protective ensemble, boots and gloves with assistance from the attendant, as required.

b. Doffing procedures for the OSHA Level B Trelleborg HPS/TS are outlined on page 26 of this SOP.

b. For OSHA Modified Level B, a PDS team member will remove the hood from the face piece assembly as follows:

(1) Unsnap hood.

(2) Pull hood overhead while holding hand on face piece in place.

(3) While holding face piece securely in place, pull sharply at the corner to remove the hood from the face piece.

(4) Slide hood and sleeve down to the regulator assembly on harness.

NOTE: Ensure that the air cylinder is turned on and that both the 4 ft regulator hose and the manifold adapter hose are attached. Remind wearer to take a deep breath and hold prior to disconnecting and reconnecting hoses.

(5) While holding the regulator on harness assembly, push in on face piece hose and pull back on the locking device, disconnecting and reconnecting hoses.

(6) Quickly slide the hood and sleeve off the face piece assembly.

(7) Connect the face piece hose to regulator hose from fresh bottle.

NOTE: If there is a problem with the connection between the face piece hose and the regulator hose assembly reconnect to regulator assembly and try another hose and cylinder assemble.

c. Personnel wearing SCBA will have a new tank attached from the cold side of the LCL if required. The tank, harness assembly, hood and sleeves are removed along with the outer garments. All outer garments will remain on the hot side of the LCL. They will continue through the PDS with assistance from the attendant.

2.3.8 Station 8 -- Inner Garment Removal. All remaining clothing is removed at this station. Place inner garments in barrel.

NOTE: If jewelry (i.e., watches, rings, earrings) was worn in the contaminated area it will remain at this station.

2.3.9 Station 9 -- Mask and SCBA Face Piece Removal. PDS Team Member tells individual to take a deep breath and hold, remove mask, place it in the barrel, and proceed to station 10. PDS Member will disconnect the face piece hose from the hose assembly and bring the cylinder and hose assembly back to the LCL.

2.3.10 Station 10 -- Shower. While holding your breath:

a. Walk under the tent.

b. Step into the sump area.

c. Wash entire body with soap and water starting with head and neck then resume breathing.

d. Cross the Contamination Control Line to station 11.

2.3.11 Station 11 -- Redress/First Aid. Dry off, redress, and proceed to the medical station.

2.4 Cylinder Change-out for OSHA Modified Level B Wearers. Personnel wearing Modified Level B at the chemical event site may run low on air. Due to mission requirement(s), personnel in OSHA Modified Level B may need a cylinder changed out to continue work.

a. The OSHA Modified Level B wearer will return to the LCL upon hearing the alarm on the SCBA or when told that time has expired by the CPO. Personnel will use the buddy system. Personnel will leave all tools and equipment at the chemical event site.

b. The OSHA Modified Level B wearer needing cylinder change out will walk up to and stop at the LCL.

c. A PDS team member will have the following equipment on hand:

(1) Full replacement cylinder.

(2) Full cylinder for cylinder change out.

(3) 4' regulator hose.

(4) Manifold Adapter Hose.

d. The PDS team member operating the above equipment will connect the Manifold Adapter Hose to the 4 ft regulator hose. The regulator hose is then connected to the change-out cylinder and the air turned on.

e. The PDS team member will take the black stopper off the manifold and connect the manifold adapter hose.

f. A PDS team member will turn off the cylinder air on the harness. The OSHA Modified Level B wearer will verify that there is air still flowing into his/her mask.

NOTE: If the wearer is not getting air, turn cylinder on harness back on; check connection; turn cylinder on harness off. If wearer is getting air, proceed with change-out, if wearer is still not getting air, turn cylinder in harness back on; process wearer through PDS; send in back-up person.

g. A PDS team member will unscrew the regulator hose from the cylinder on the harness.

h. Have the OSHA Modified Level B wearer turn around, face the equipment drop, and bend forward slightly. A PDS team member will loosen the toggle link that holds the cylinder to the harness. After the toggle link is loosened, the cylinder holder is pressed down. Once the cylinder holder is pressed down, the PDS team member can slide the cylinder off the harness. Place this cylinder on the equipment drop cloth.

i. Have the OSHA Modified Level B wearer re-face the LCL and bend slightly forward.

j. A PDS team member will slide a fresh full cylinder through the toggle link on the harness.

k. The PDS team member will ensure that the toggle link is tightened, and that the cylinder holder is locked on the new cylinder. After the cylinder is in place, connect the regulator hose on the harness to the full cylinder. Once properly tightened, turn the air fully on.

l. The PDS team member will disconnect the manifold adapter hose from the manifold.

NOTE: Before disconnecting the manifold adapter hose from manifold turn air off on replacement cylinder to verify that the wearer is getting air from new cylinder.

If wearer is not getting air, check connections. If connections are good and wearer is still not getting air, process wearer through PDS; send in back-up person.

m. Once the PDS team member determines the equipment is working properly, the OSHA Modified Level B wearer may return downrange.

Chapter 3 -- SETTING UP A PDS TO SUPPORT CHEMICAL AGENT ACCIDENT/INCIDENT

3.1 GENERAL. All stations are set up one to two meters apart, with a 30-meter minimum distance between stations 7 and 8.

3.2 Station 1 is the Equipment Drop. Station 1 consists of a plastic drop cloth. It may also consist of a container, double-lined with large plastic bags. The corners of the drop cloth will be weighted to prevent wind gusts from moving the plastic sheeting. Any overlapping sheets will be taped together over the entire length of the seam.

NOTE: Stations 2 through 7 are located inside a sump area to prevent liquid waste from entering the ground.

3.3 Station 2 is the Shuffle Pan. Station 2 consists of one brush, and a plastic or metal decon (shuffle) pan with smooth or protected edges. Upon the first indication that personnel are processing through the PDS, household bleach or its equivalent is poured into the shuffle pan to a depth of 3-4 inches.

NOTE: Before mixing or pouring any decon, consult with CPO. The use of decon creates hazardous waste.

3.4 Station 3 is the Outer Garment Decon. Station 3 consists of one shuffle pan, one plastic barrel or bug sprayer, one brush and one sponge. Upon the first indication that personnel will be processing through the PDS, the appropriate decontaminant for the contaminating agent is mixed and poured into the plastic decon barrel or use household bleach in the bug sprayer.

NOTE: After using the bug sprayer with bleach be sure to thoroughly rinse the bug sprayer and let dry.

3.5 Station 4 is the Detailed Outer Garment Wash. Station 4 consists of one shuffle pan, one plastic barrel, two brushes and two sponges. The wash barrel is filled with hot soapy water.

3.6 Station 5 is the Detailed Outer Garment Rinse. Station 5 consists of one shuffle pan and one rinse barrel (a hose and wand connected to the water source may be used to spray) filled with fresh water.

3.7 Station 6 is the Monitoring Check Point. Station 6 consists of one M90, CAM, or a package of M8 paper.

3.8 Station 7 is the Outer Garment Removal and Drop, Station 7 consists of one trash can (minimum), double-lined with large clear plastic bags, one chair, and a plastic drop cloth for SCBA. The trashcan is placed on the "hot side" of the LCL. Place the chair

beside the LCL, but on the "hot side" of the line. Place one pair of scissors beside the chair. Mark the LCL with a long piece of engineer tape that is secured to the surface.
3.9 Station 8 is the Inner Garment Removal. Station 8 consists of one plastic barrel, double-lined with large clear plastic bags.

3.10 Station 9 is the Mask/SCBA Removal. Station 9 consists of one trashcan, double-lined with large clear plastic bags, and drop cloths for all SCBA systems used.

3.11 Station 10 is the Decon Trailer. Station 10 consists of a trailer or tent.

NOTE: The water source will be run at idle speed so the hose adapters for the shower assembly and the rinse wand are not blown off.

3.12 Station 11 is the Redress/First Aid station. Station 11 consists of towels and clothing for all processing personnel. Check processing personnel for signs of agent exposure and treat for any injuries by medical personnel. This station is located in trailer when it is used.

NOTE: After a team has processed through the Hot Line all liquid waste is containerized in a liquid hazardous waste drum to prevent the spread of possible contamination.

Chapter 4 -- DECONTAMINATION TEAM

4.1 Personnel

a. Medical team, 1 **(from Dispensary)**

b. Hot side personnel, 4 **(dressed in OSHA Level C)**

c. Cold side personnel, 2 **(dressed in OSHA Level C)**

d. Water source operator, 1 **(dressed in OSHA Level D)**

e. PDS Team Leader, 1 **(dressed in OSHA Level C)**

f. CCL recorder, 1 **(dressed in OSHA Level D)**

g. MINICAMS operator, 1 **(dressed in OSHA Level D)**

4.2 Casualty Evacuation Equipment:

4.2.1 Hot side

a. Scissors, 1 pair

b. Stretcher, 1

c. Bleach, 3 gallons

d. Water, 15 gallons

e. Sump container, 1

f. Brushes, 2

g. Sponges, 2

h. Back-up SCBA, 2

4.2.2 Cold side

Stretcher with blanket, 1

4.3 Description of PPE levels.

4.3.1 OSHA Level B will consist of:

a. Trelleborg HPS/TS or Tyvek F suit.

b. M3 Toxicological Agent Protective (TAP) gloves.

c. M2 TAP boots.

d. Interspiro 9030 SCBA.

4.3.2 OSHA Level C consists of:

a. M2 TAP apron or Tyvek F suit.

b. M2 TAP boots.

c. M3 TAP gloves.

d. M40A1, MCU2P or British S-10 Mask

e. M40A1, MCU2P or British S-10 butyl hood.

4.3.3 OSHA Level D consists of:

a. Work clothes, ammunition handler's cotton coveralls or Tyvek F suit.

b. M40A1, MCU2P or British S-10 mask slung.

c. Steel toe work shoes.

Chapter 5 -- CLOSING DOWN A PDS

5.1 General. Personal protective equipment (PPE) worn or used in known agent-contaminated areas will be monitored.

5.2 Personnel Decontamination Station Breakdown. The PDS is dismantled after the down range operations at the chemical event site are completed and all personnel have processed through the PDS. Once all personnel at the event site have processed through the PDS, the following procedures are accomplished:

a. The four PDS team members on the hot side of the LCL will:

(1) Acquire the proper decontaminants and supplies.

(2) Prepare the decontaminants and supplies to process the equipment on the line (i.e. open bags, ready the masking tape, markers and the appropriate decon/rinse).

(3) Segregate all of the clean, reusable equipment that is not needed, and pass the items to PDS team members in the Chemical Reduction Area (CRA). Ensure that good contamination control discipline is utilized to avoid the transfer of contaminant.

(4) Separate potentially contaminated material into five categories:

(a) Return equipment that is usable once sufficiently decontaminated.

(b) Protective clothing/equipment that has liquid contamination on it.

NOTE: Protective clothing/equipment that has liquid contamination will be decontaminated, monitored to 3X and disposed of in accordance with the local Environmental Laws.

(c) Return protective clothing that is usable, once sufficiently decontaminated.

(d) Electrical equipment.

(e) Waste expendable.

(5) Place all of the reusable equipment and protective clothing into 6 mil clear plastic bags or plastic sheeting. Label the bags with the contents, the decontaminant used, the quantity of each item, and the date. When sufficient time has elapsed to take a concentrated vapor test, monitor with a gross level detector to certify if the items are sufficiently clean. If not, they will be decontaminated again and the procedure repeated until the items are clean.

(6) Decontaminate each other and process through the line once all potentially contaminated items are decontaminated and checked. The remaining members of the PDS team will:

(a) Continue to process themselves through the decon line, bagging and monitoring the clothing, equipment and waste as was done on the hot side of the LCL. All containers of decontaminant and wastewater will remain on the line for handling by the recovery team.

(b) The last person to process through the line will remove his mask and place it in the bag provided.

(c) Proceed to the redress area for dressing, observation and first aid, if required.

5.3 Recovery Team Procedures. The recovery team will conduct site closeout operations. Once all the preliminary work is done, complete the following:

a. Place M40 masks in double 6 mil plastic bags and seal. Mark the outside of bag with potential contamination, contents, date, decontaminant used and quantity. Gross-level monitor the bags containing the masks using the M18A2 Kit, M90 or the Chemical Agent Monitor (CAM). Masks will be transported to the monitoring holding area.

b. Liquid waste (decontaminant and rinse water) is containerized in a liquid hazardous waste drum or metal drum with the appropriate liner prior to the decontamination and gross-level monitoring of buckets and step-in pans.

c. All bags with negative results will be numbered (i.e. 1 through 10) and checked for proper labeling. Prepare a list summarizing the contents and take them to the holding area at the conclusion of operations.

d. Monitor all reusable equipment on post and equipment destined to be destroyed and decontaminated to 3X standards and segregate by type. Hold for final disposition.

e. Once the PDS line is emptied, perform area decontamination at the PDS line and any additional areas that are contaminated during operations.

5.4 Disposition of Clothing and Equipment.

a. ECBC personnel will move clothing and equipment contaminated with agents G, V, and H series (that test negative with gross level monitors) to an approved monitoring holding area.

b. Store clothing and equipment at 70 degrees F or higher for at least 4 hours prior to monitoring.

c. ECBC personnel will notify the Monitoring Branch (5-4479) and request low-level monitoring support. They will inform monitoring branch of:

(1) Location and number of bags.

(2) Results of gross-level monitoring.

(3) Potential contamination.

d. Liquid contaminated clothing and equipment will be marked for disposal. Vapor contaminated clothing and equipment will be monitored. After negative monitoring results are obtained, the PDS Team, will inventory and return clothing and equipment to the laundry. A copy of the clearance document, will accompany each bag that is monitored. Inventory equipment returning to the laundry will be marked IAW the following procedures:

(1) Complete a ECBC Form Letter 1095-E-R (Decontamination Certificate) for each piece of equipment.

(2) Permanently engrave or mark all tools and equipment with a green stripe using a permanent type marking.

e. Clothing and equipment contaminated with AC, CK and CG will be marked for disposal.

f. The PDS Team Leader will complete an inventory and turn in clothing to the ECBC Laundry Facility. A copy of the clearance memorandum will accompany each bag that is returned to the laundry facility.

5.5 Disposition of Solid Waste.

a. Separate solid waste 3X materials from serviceable clothing and equipment and process as lab waste. Sponges, brushes, drop cloths; rags, spill pillows and plastic bags are examples of waste.

b. Place the 3X waste in double 6 mil plastic bags and then into fiber drums for turn-in by the installation. Decontaminate this material to 3X standards by the decon team, and have it quantitatively monitored by the monitoring branch.

c. Containerize contaminated soil in the appropriate DOT approved container. Soil will be monitored to the 3X level and turned in as hazardous waste in accordance with local environmental regulations.

5.6 Disposition of Liquid Waste.

a. Liquid waste generated by the PDS, will be containerized by the Recovery Team in polyethylene-lined drums meeting DOT 37M or 25L specifications. The waste will be analyzed and turned in as hazardous waste in accordance with local environmental regulations.

b. Decontaminate liquid waste in the following manner:

(1) GB contaminated waste -- 10% Sodium Carbonate (Washing Soda) solution.

(2) VX contaminated waste -- Sodium Hypochlorite (bleach) or a 10% solution of Calcium Hypochlorite Bleach (HTH).

(3) HD contaminated waste -- Sodium Hypochlorite (bleach) or a 10% solution of Calcium Hypochlorite Bleach (HTH).

(4) AC, CK and CG contaminated waste -- 10% Sodium Carbonate (washing soda), solution.

(5) Lewisite contaminated waste -- Calcium Hypochlorite (HTH).

c. After decontamination is completed, the waste will be analyzed and turned in as hazardous waste IAW local environmental regulations.

(1) ECBC will complete a Liquid Waste Turn-In Certification Sheet after results of chemical analysis have been obtained.

(2) Liquid waste that is potentially contaminated with CSM/CWM will be transported to an approved holding area.

5.7 Personnel Decontamination Station Dismantling. Dismantle the PDS after the work party at the chemical event site has completed their mission and processed through the PDS. Once all personnel at the event site have processed through the PDS, accomplish the following procedures:

e. Emergency Response: Decontaminate, double bag and return to the laundry all equipment and clothing used during an emergency response.

Appendix A

DOFFING TRELLEBORG HPS/TS ENSEMBLE

STEP 1: REMOVE CASCADE AIR LINE
In contaminated area turn on reserve air tank.
In contaminated area disconnect cascade air connection at suit.
STEP 2: REMOVE OUTER TAP GLOVES
Ensure proper DECON procedures have been performed.
Have DECON operator pull cuff of gloves toward him and off of plastic sleeve of suit until gloves are off. This will also remove rubber band seals.
Place gloves in proper container.
STEP 3: DOFF RESPIRATORY PROTECTION
Disconnect suit ventilation connection.
Disconnect harness straps and remove respiratory protection leaving face piece attached. DECON operator will hold harness and reserve bottle.
STEP 4: REMOVE HANDS AND ARMS FROM SUIT
DECON operator will hold 3M glove while operator removes hand and arm out from sleeve of suit. When both arms are removed place hands up inside of suit and beside right and left side of cheeks.
STEP 5: OPEN SUIT
Have DECON operator standing by with fresh negative air respirator.
Open zipper guard by pulling zipper ring all the way to shoulder.
STEP 6: REMOVE FACE PIECE
Loosen straps of head harness.
Have operator hold his/her breath.
Pull face piece out and up from chin to remove.
Place respiratory unit in proper container.
STEP 7: REMOVE HEAD FROM HOOD OF SUIT
Have operator push hands up and out from cheeks.
Have operator duck head under and out of hood while DECON operator pulls hood up and off.
Place negative air respirator on operators face and install head harness.
Have operator tighten head harness and clear respirator.
STEP 8: DOFF SUIT AND BOOTS
Doff suit down to knees and have operator sit.
Remove boots and silk over socks and place in proper container.
Remove suit and place in proper container
STEP 9: REMOVE NEGATIVE AIR RESPIRATOR
Have operator proceed to the clean shower room.
Before entering the clean area operator will hold breath, doff respirator and place in the proper container.
Enter clean area.

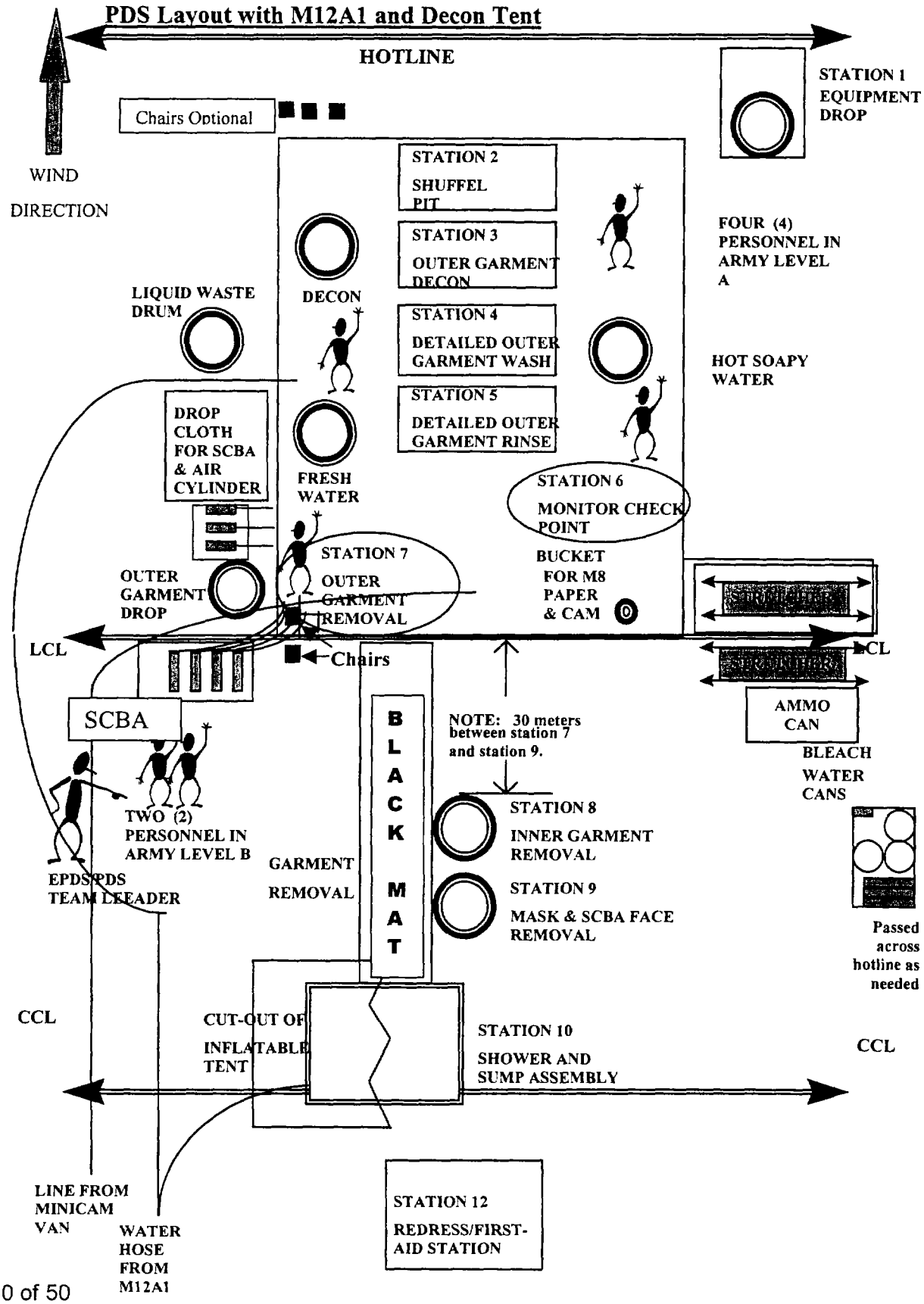
Appendix B

PDS EQUIPMENT CHECKLIST

ITEM	QTY
Generator, 3500X, Honda	1
CAM	2
Radio, Hand-held w/ spare battery	1
Box, Plastic Bags, Clear, Large 6 mil	As Needed
Spill Pillows	10
Stretchers	2
Chairs	2
Bag, Assembly, Shower	1
Sump, Shower	1
Sump, PDS, Large	1
Sump, Yellow for stretcher	1
Extension Cord for pump, 50 ft	2
Hose, garden w/ 4 connections	2
Sprayers	2
Drum, 55-gal and Funnel	1
Garbage Cans, Large	6
Shovel	1
Hammer, Sledge	1
Pick	1
Ax	7
Buckets, Kill	1
Pail, 1 gal	5
Brush, long handle	4
Grate, Black	1
Jack, Boot	1
Mat, Roll-up	As Needed
Tank, Air	As Needed
Roll, Plastic Bags, Small, 6 mil	1
Roll, Plastic Bags, Dark, Large, 6 mil	1
Tent, blow up	1
Jugs, 5-gal	6
Coolers, water	2
Pans, Step/Shuffle, Large	6
Box, Bleach (Labeled with test results and paperwork)	1
Fire Extinguisher	1

PDS EQUIPMENT CHECKLIST (cont'd)

ITEM	QTY
PDS Box, Rubbermaid	4
Engineer Tape	2 Roll
Sponge, Bath	6
Tape, Masking, 2" wide	2 Roll
Soap, Liquid, bottle	1
M8 Paper	2
Scissors	2
J-Knife	1
Respirator fit-test ampoules	4 boxes
Bucket, 15 gal	1
Tent peg, metal	14
Tape, Duct, Metallic, 2" wide	many
Gloves, Surgeon, Size 8	1 box
4" Regular Hose (1/MLA)	3
Manifold Adapter (1/MLA)	3
Wool Blankets	10
Towels	36
Coveralls	20
Shower Shoes	many


PDS Layout with M12A1 and Decon Tent
HOTLINE
STATION 1
EQUIPMENT
DROP
Chairs Optional
WIND
DIRECTION
STATION 2
SHUFFEL
PIT
STATION 3
OUTER GARMENT
DECON
FOUR (4)
PERSONNEL IN
ARMY LEVEL
A
LIQUID WASTE
DRUM
DECON
STATION 4
DETAILED OUTER
GARMENT WASH
HOT SOAPY
WATER
STATION 5
DETAILED OUTER
GARMENT RINSE
DROP
CLOTH
FOR SCBA
& AIR
CYLINDER
FRESH
WATER
STATION 6
MONITOR CHECK
POINT
STATION 7
OUTER
GARMENT
REMOVAL
BUCKET
FOR M8
PAPER
& CAM
OUTER
GARMENT
DROP
LCL
Chairs
LCL
SCBA
AMMO
CAN
BLEACH
WATER
CANS
NOTE: 30 meters
between station 7
and station 9.
B
L
A
C
K
M
A
T
STATION 8
INNER GARMENT
REMOVAL
TWO (2)
PERSONNEL IN
ARMY LEVEL B
GARMENT
REMOVAL
STATION 9
MASK & SCBA FACE
REMOVAL
EPDS/PDS
TEAM LEADER
Passed
across
hotline as
needed
CCL
CUT-OUT OF
INFLATABLE
TENT
STATION 10
SHOWER AND
SUMP ASSEMBLY
CCL
LINE FROM
MINICAM
VAN
WATER
HOSE
FROM
M12A1
STATION 12
REDRESS/FIRST-
AID STATION

Chapter 6 -- EXPLOSIVE DESTRUCTION SYSTEM (EDS) PERSONNEL DECONTAMINATION STATION (PDS)

6.1 Set Up Procedure.

6.1.1 Equipment Drop: Consists of a container, double lined with 6 mil plastic bags.

6.1.2 Station # 1: Consists of a shuffle pan and one barrel or bug sprayer, one brush and one sponge. Upon the first indication that personnel will be processing through the PDS, the appropriate decontaminate for the contaminating agent is mixed and poured into the plastic decon barrel or use household bleach in the bug sprayer.

6.1.3 Station # 2: Consists of a shuffle pan and one barrel, two brushes and two sponges. The wash barrel is filled with hot soapy water.

6.1.4 Station # 3: Consists of one shuffle pan and one rinse barrel (a hose and wand connected to the water source may be used to spray) filled with fresh water.

6.1.5 Station # 4: Consist of M8 paper or CAM.

6.1.6 Station # 5: PPE Removal: Consist on one trash can (minimum), double lined with 6 mil large clear plastic bags, one chair and a plastic drop cloth for SCBA if used. A pair of scissors is placed beside the chair.

6.1.7 Station # 6: Consist of one trashcan, double lined with two large clear 6 mil plastic bags and drop cloths for all SCBA systems used.

6.2 Personnel Decontamination Procedure.

6.2.1 Station # 1: Gross Decon: PDS team members will gross decon individuals Personnel Protective Equipment (PPE) from head to toe with bleach concentrating on hands and feet Particular attention will be taken to the treads on the under sole of the boot. This will be accomplished using sponges or garden sprayers. Individual will cover the canister inlet with hand when PDS team member applies decon to the mask area. Care must be taken not to get any moisture in the inlet of the filter canister. When gross decon is accomplished the PDS team member will instruct individual to proceed to station #2.

6.2.2 Station # 2: Wash and scrub down: PDS team members will thoroughly wash and scrub individual's PPE from head to toe with hot soapy water concentrating on hands and feet. Individual will again hold hand over the inlet of the canister when the PDS member applies a soap and water mixture to the mask area. This procedure will be accomplished with the use of sponges and brushes. Extra attention will again be taken to the treads of the under sole of the boot. All dirt

lodged in the treads must be removed. When the wash and scrub down is accomplished the PDS team member will instruct individual to proceed to station # 3.

6.2.3 Station # 3: Rinse: PDS team members will rinse individuals PPE from head to toe with clean water. Individual will again cover the inlet of the canister when the PDS member applies fresh water to the mask area. This procedure will be accomplished by using garden sprayers or sponges. When a thorough rinse is accomplished the PDS team member will instruct the individual to proceed to station # 4.

6.2.4 Station # 4: Personnel Monitoring: PDS team members will monitor the individual from head to toe to ensure all contamination has been removed. This will be accomplished by using M8 paper or a Chemical Agent Monitor (CAM). If contamination is still present the PDS team member will instruct the individual to return back to station #1 to repeat decon process. If individual shows no sign of contamination the PDS team member will instruct individual to proceed to station # 5.

6.2.5 Station # 5: PPE Removal: PDS team members will doff individuals PPE. If individual is wearing the Tyvek F ensemble the PDS team members will remove the boots and outer gloves. Next the ensemble will be cut with medical scissors starting at the top of the head and work down to the boot area. All PPE will be placed in 6mil bags. If individual is wearing an OSHA level "B" Trelleborg suit doffing procedures will be followed in accordance with Appendix A. When all PPE except the mask is removed the PDS team member will instruct individual to proceed to station # 6.

6.2.6 Station # 6: Mask Removal: A PDS team member will ask the individual to hold their breath, remove mask and place it in a 6mil bag then exit the PDS area. When entering the clean area the individual can resume breathing. Individual will then proceed to the medical location to be examined.

NOTE: All PDS team members will process through the decon line.

6.3 PDS Breakdown.

6.3.1 Breakdown. The PDS will be broken down IAW Chapter 5, 5.1 – 5.2.

6.4 Recovery Team Procedures.

6.4.1 Recovery Team. Recovery team procedures will be accomplished IAW procedures outlined in Chapter 5, 5.3.

6.5 Disposition of Clothing and Equipment.

6.5.1 Clothing and Equipment. Clothing and equipment will be disposed IAW procedures outlined in Chapter 5, 5.4.

6.6 Disposal of Waste

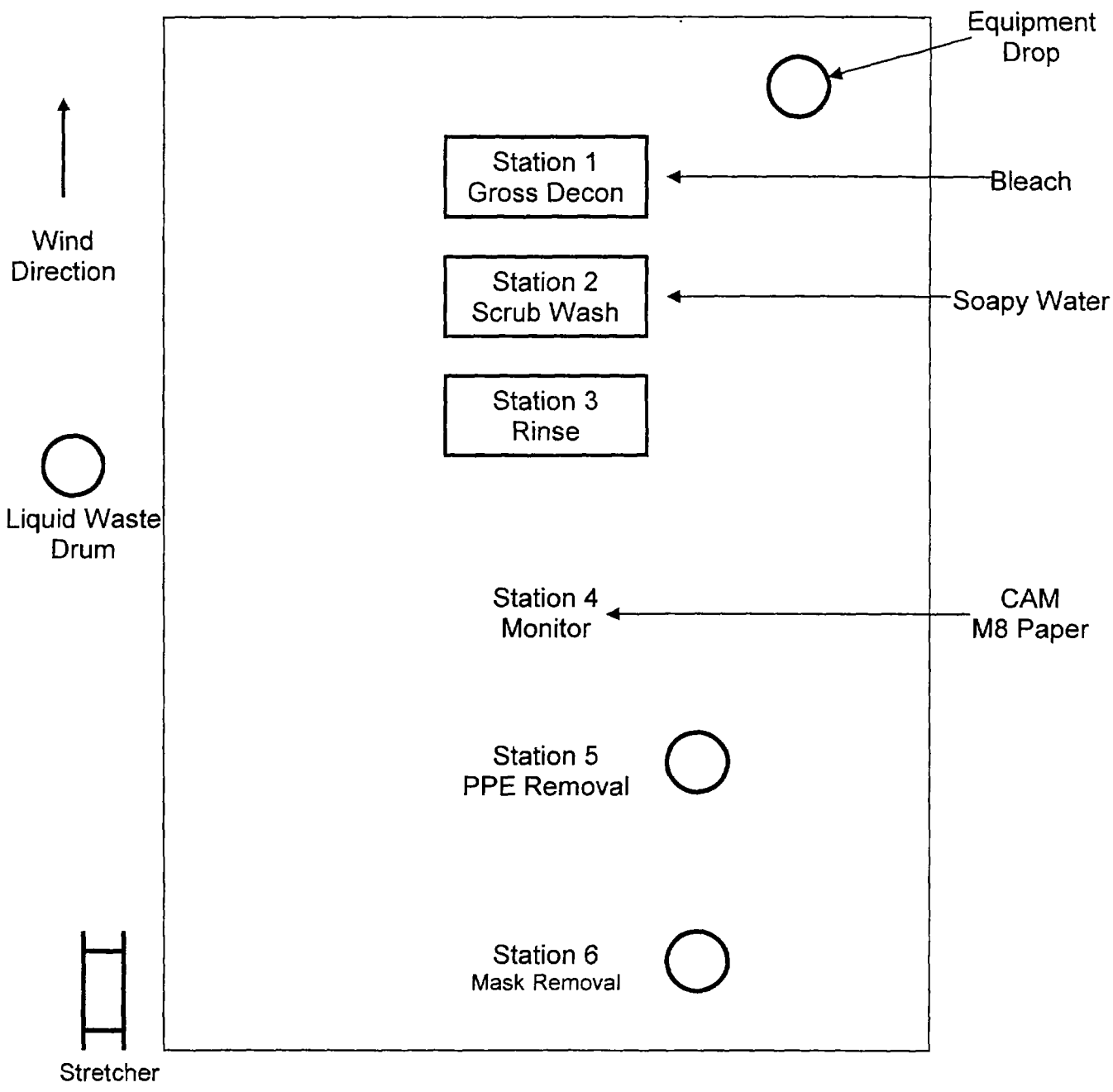
6.6.1 Waste Disposal. Disposition of waste will be accomplished IAW procedures outlined in Chapter 5, 5.5 – 5.6

6.7 PDS Dismantling Procedures.

6.7.1 Dismantling. DS dismantling will be accomplished IAW procedures outlined in Chapter 5, 5.7.

6.8 EDS, PDS Layout (Next Page).

EDS PERSONNEL DECONTAMINATION STATION LAYOUT



* Requires Three Personnel to Operate

Chapter 7 -- MOBILE PERSONNEL DECONTAMINATION SYSTEM (MPDS)

7.1 Operating procedures.

a. Park trailer on as level ground possible. Lower dollies to take tension off of trailer.

7.2 Set-Up Procedures.

a. Shore Power – Refer to page 37.

b. Generator – Refer to page 40.

7.2.1 Process thru step pan(s).

a. Personnel reporting from down range will report to the Hot Line.

b. Hot Line personnel will instruct personnel reporting for processing thru the step pans. The first pan contains bleach, wash/scrub boots, paying particular attention to soles of boots. The second pan contains water. Rinse boots.

7.3 Process thru MPDS

7.3.1 Process thru MPDS in order described below.

NOTE: REFER TO PAGE 48 FOR DIAGRAM.

a. Station A: DECON SHOWER.
   (1) Brush over garment
   (2) Wait for five (5) minute contact time.
   (3) Open door.
   (4) Step into next room (Station B).

b. Station B: AUTO WASH.
   (1) Close door.
   (2) Press Red button.
   (3) Slowly raise and lower arms during shower.
   (4) Open door.
   (5) Wait until clothing is tested with M8 paper, Use hand rails when boot soles are checked.
   (6) Step into next room (Station C).

c. Station C: OVERGARMENT DOWN DRESS.
   (1) Close door.

(2) Stand in center of room.
(3) Remove outer gloves.
(4) Remove overgarment to half mast.
(5) Sit on bench.
(6) Remove boots and suit at the same time.
(7) Hold feet above floor.
(8) Swing legs around and stand in curbed area.
(9) When operator opens door step into next room (Station D).

d. Station D: RPE DOWN DRESS.
(1) Close door.
(2) If wearing supplied air, back up to ceiling hook to support weight of system. Remove supplied air system, all but face piece.
(3) Remove cotton coveralls and impregnated clothing.
(4) Take a deep breath and hold.
(5) Remove face piece.
(6) Open door.
(7) Step into next room (Station E).

e. Station E: UNDER GARMENT DOWN DRESS.
(1) Close door and breath freely.
(2) Remove all clothing.
(3) Open door.
(4) Step into next room (Station F).

f. Station F: DERMAL SHOWER.
(1) Close door.
(2) Turn shower handle counter clockwise.
(3) Wash with soap supplied in dispenser located on wall.

CAUTION: TURNING HANDLE TO FAR COULD CAUSE SKIN BURNS.

(4) When finished turn fully clock-wise.
(5) Open door.
(6) Step into next room (Station G).

g. Station G: DRYING ROOM.
(1) Close door.
(2) Dry off with towel from cabinet.
(3) Drop towel through chute.
(4) Dress in coveralls from cabinet.
(5) Open curtain.
(6) Step into next room (Station H).

h. Station H: SUPPLY ROOM.
(1) Close curtain.
(2) Dress in sneakers from cabinet.

(3) Wait for clearance from RTAP operator to insure no contamination is present (3) Exit trailer.
(4) Report to the Medical Personnel for a medical check.
(5) MPDS personnel will process through line after all other personnel have been processed.

Chapter 8 -- MOBILE PERSONNEL DECONTAMINATION SYSTEM START UP PROCEDURES SHORE POWER

8.1 CONNECT POWER.

a. Move Service Disconnect switch on front of trailer, to **OFF** position.

b. Connect ground cable to earth ground rod and cable provided.

c. After verification of electrical power source output, connect power cable.

8.2 OUTSIDE SET UP.

a. Lower equipment room ladder to enter equipment room.

b. Lower front and back platforms and affix folding steps with tee bolts and adjust step risers until steps are at the correct angle.

c. Remove barrels, signs, benches, step pans and drop shoots from trailer. Set up in appropriate locations.

8.3 SYSTEM START-UP.

a. Move power switch in equipment room to SHORE POWER position.

b. Move service disconnect switch to **ON** position.

NOTE: A low fresh water level alarm will sound; a low fresh water level indicator light will lite and a low decon solution level light will lite.

c. Begin to fill fresh water tank with fresh portable water to extinguish alarm and light. Indicator lights located near the personnel access door will indicate when the tank is full. After fresh water reaches a pre-set level in the tank, the low level switch inside the tank will open the circuit.

d. Fill solution tank with decon solution from a drum. Solution fill port is located on the street side of the trailer forward of hot line striping. Indicator lights located near a personnel access door will indicate when the tank is full. After the tank, the low level light will extinguish.

e. Verify that a small amount of pump oil is visible in neck of fill pipe of water pump. Add a small amount of lubricant, if required.

f. Turn on interior lights. Verify that lights in equipment room, clothing issue, dermal shower, undergarment down dress, respirator protective equipment (RPE) down

dress, impreg down dress, over garment sown dress, auto shower and hot side decon room are lit.

g. Turn on exterior lights and verify operation. Turn off if operating in daylight.

h. Move switch for exhaust fan creating negative air and HEPA FILTER to ON position.

NOTE: Alarm will sound until airflow is sufficient to move sail switch and silence alarm.

i. Momentarily turn SHOWER PUMP switch on to check pump motor operation.

j. Activate DECON BRUSH PUMP momentarily to verify operation.

k. Turn on TANK HEATER switch and observe indicator light.

l. Turn on AUTO SHOWER LINE switch to verify operation. Observe indicator light. AUTO SHOWER OVERRIDE switch operates only when the auto shower is operating.

m. Check fresh water FULL LIGHT. Continue to fill tank, when full, disconnect fill hose **(Low water light alarm should be extinguished by now).**

n. Open valve in dermal shower at a temperature to left of midpoint and warm.

o. Prime pump **(CHAPTER 11.4)**. Turn on water pump and begin to purge air from water lines.

p. Purge air from shower nozzle. Momentarily push auto show activate button to purge auto shower spray heads of air. Manual control switch may be tested at this time. Continue operating auto shower button until water is running freely with no air. Verify the dermal shower is also free of air and turn off water.

q. Open gas valves on propane storage tanks, located on front of trailer.

r. Open gas valve at each propane gas fueled water heater. Valve is located in center at the bottom of each heater. Valve handle should be in line with gas supply line.

s. Light pilot light by depressing center knob or larger knob and moving to pilot position. Small blue flame should be observed through sight glass, hold pilot knob in pilot position for a few seconds to heat thermocouple then move knob to **ON** position. Flame should remain. If flame is not present try again. If, after a third try no ignition is observed, then check propane tank fill lever and gas supply to

heaters. If propane gas is detected by smell, leave trailer immediately, leave door open and contact maintenance.

t. After ignition is achieved, turn on water in dermal shower to warm water side. Observe the burner in propane gas water heater. If burner flame is not present or is inoperative, contact maintenance. If water heater is operational, warm water will be present at the shower head within a few seconds. Test water with hand carefully. If warm water is present then shut of water.

CAUTION: Hot water can cause scalding and severe burns.

u. Turn emergency power switch in clothing issue room to **ON** position. Press test button and observe emergency egress lighting. Leave toggle switch in **ON** position.

v. Activate hot side decon wash, with help, and verify that solution is being pumped to the brush head.

w. Activate auto shower and time the on/off cycle. Present setting is **30** seconds. The adjustment may be changed by resetting the timer. The timer is located in the clothing issue room. Timer indicates seconds of operation. Temperature is present and cannot be adjusted.

x. Set heater and air conditioner thermostat to desired setting. Select heat/cool/off/fan auto/on. A delay will be noted when switching from one mode to another.

y. All receptacles are 110/120 VAC, 20 Amps, Ground Fault Interrupt Circuit (GFCI).

CCHAPTER 9 -- MOBILE PERSONNEL DECONTAMINATION SYSTEM START UP PROCEDURES GENERATOR POWER

9.1 GENERATOR SET UP

a. Check on level of oil in crankcase of diesel engine fill with manufactures recommended oil, if required. Do not overfill.

b. Check fluid in radiator, fill with coolant. Follow manufactures instructions.

c. Check fuel level. Gage located on skid tank. Fill located on the exterior of trailer, curbside near the front of trailer.

d. Set breaker on generator to **ON**. Turn power switch to generator position.

e. The service disconnect switch at the front of trailer should be in the **OFF** position.

f. Connect the ground cable to earth ground using ground rod and cable provided.

g. Enter clothing issue room for generator control panel. Set toggle switch in start position.

9.2 SYSTEM START-UP

a. Push start button. Leave toggle switch in **START** position until low oil pressure light is extinguished. Then move toggle switch to **RUN** position.

b. Observe gages at the top of panel, generator output. A/C volts at 220/240. Hertz 60. A/C amperes will vary with load. Observe gages on right side of panel (engine gages), bottom to top.

NOTE: Elapsed time meter should rotate. Check last digit on right. Amperes should read at a position which indicates a plus (+) from midpoint. Oil pressure near midpoint depending on load. Temperature should begin to climb to approximately 100 F.

NOTE: A low fresh water alarm will sound; a low fresh water level indicator light will lite and a low decon solution light will lite.

c. Begin to fill fresh water tank with fresh potable water to extinguish alarm and light. Indicator lights located near the personnel access door will indicate when the tank is full. After fresh water reaches a level in the tank the low level light and alarm circuit will be open and the light will go out and the alarm will be silenced.

d. Fill solution tank with decon solution from drum. The solution fill port is located on the street side of the trailer forward of the hot line striping. Indicator lights located near the

personnel access door will indicate when tank is full. After solution reaches a level within the tank the low level light will extinguish.

e. Turn on interior lights. Verify that lights in equipment room, clothing issue, dermal shower, undergarment down dress, respiratory protective equipment down dress, impreg down dress, outer garment down dress, auto shower and hot side decon room are lit.

f. Move HEPA FILTER switch to the ON position.

NOTE: Alarm sounds until airflow is sufficient to move sail switch and silence alarm.

g. Turn on exterior lights and verify operation. Turn off if operation in daylight.

h. Verify that a small amount of oil is visible in neck of fill pipe of water pump. Add a small amount of lubricant, if required. Momentarily turn water pump on to check pump motor operation.

i. Turn on TANK HEATER switch. Observe indicator light.

j. Turn on AUTO SHOWER LINE switch. Observe indicator light. The AUTO SHOWER OVERRIDE switch operates only when the auto shower is in operation.

k. Check fresh water full light. Continue to fill tank, when full, disconnect the fill hose. Low water light and alarm should be extinguished by now.

l. Open valve in dermal shower at a temperature to the left of midpoint or warm.

m. Prime pump **(CHAPTER 11.4).** Turn on water and begin to purge air from lines.

n. Purge air from shower nozzle. Momentarily push auto shower activate button to purge auto shower spray heads of air. Manual control switch may be tested at this time. Continue operating auto shower button until water is running freely with no air. Verify that the dermal shower is also free of air and turn off water.

o. Open gas valves on propane storage tanks, located on front of trailer.

p. Open gas valve at each propane fueled water heater. Valve is located in the center at the bottom of each heater. Valve handle should be in line with the gas supply line.

q. Light the pilot light by depressing center knob or larger knob and moving to pilot position. A small blue flame should be observed through the sight glass. Hold the pilot knob in the pilot position for a few seconds to allow the thermocouple to heat and then move knob to the **ON** position. If flame is not present try again. If, after the third try no ignition is observed, then check the propane tank fill lever and gas supply to heaters. If propane gas is detected by smell, leave trailer immediately, leave door open and contact maintenance.

r. After ignition is achieved, turn on water in dermal shower to warm water side. Observe the burner in the propane gas water heater. If burner flame is not present or is inoperative, contact maintenance. If water heater is operational, warm water will be present at the shower head within a few seconds. Test water with hand carefully. If warm water is present then shut off water.

CAUTION: Hot water can cause scalding and severe burns.

s. Turn the emergency power switch in the clothing issue room to the **ON** position. Press the test button and observe emergency egress lighting. Leave toggle switch in the **ON** position.

t. Activate the hot side decon wash, with help, and verify that the solution is being pumped to the brush head.

u. Activate the auto shower and time the on/off cycle. Present setting is **30** seconds. Resetting the timer may change the adjustment. The timer is located in the clothing issue room. Timer indicates seconds of operation. Temperature is present and cannot be adjusted.

v. Set heater and air conditioner thermostat to desired setting. Select heat/cool/off/fan auto/on. A delay will be noted when switching from one mode to another.

w. All receptacles are 110/120 VAC, 20 Amps, and Ground Fault Interrupt Circuit (GFIC).

CHAPTER 10 -- SHUTDOWN PROCEDURES

10.1 DECON SOLUTION TANK

a. Remove drum pump from decon solution drum and replace in drum of clear water.

b. Drain decon solution tank into suitable container. When empty replace drain plug.

c. Operate drum pump in clean water and fill decon solution tank.

d. Momentarily operate decon solution pump until clean water is flowing from the decon brush.

e. Disconnect decon solution pump and drain decon brush supply hose.

f. Momentarily operate decon solution pump to evacuate fluid from pump cavity. Reconnect decon solution brush supply hose. Clean cabinet and secure awning, crank handle and ground stakes.

g. Drain decon solution tank into suitable container. When empty replace drain plug.

h. Remove drum pump from drum of clean water, disconnect hose from quick disconnect fitting and operate pump momentarily to remove fluid from pump cavity. Store pump in holder in mechanical room along with hose.

10.2 DRAIN FLUIDS

a. Drain fluids from the gray water holding tanks into suitable basin or containers by opening ball valves at bottom of respective tanks.

NOTE: Prior to disposal, a representative sample from each container will be

b. Drain water from fresh water tank. Low fresh water alarm will sound as well as Low Level indicator lights, which will illuminate.

c. Turn off water pump. Open hose bib valve at rear of trailer and dermal shower valve. Open drains in mechanical room and at the bottom of water heaters.

d. Turn OFF gas valves at bottom of water heaters to a position, which is perpendicular to the gas supply line.

e. Open ball valve at priming port of water pump. Turn pump electrical power back on and operate pump momentarily (10 seconds) to evacuate pump cavity. This momentary

operation may be repeated up to six times to ensure that pump is dry. Turn off power to pump.

f. Check to see that the following valves listed below are in the open position.

(1) Dermal shower drain valve. Located under trailer floor by personnel entry door and decon solution fill port.

(2) Dermal shower valve.

(3) Decon brush hose. Open ball valve and purge pump to drain hose.

NOTE: Solution tank must be empty prior to purging pump.

(4) Open decon override. This will allow water to flow through solenoid valve.

(5) Gross decon spray lines. Drain valve located on the bottom of each line, (total of four).

(6) Hose bib at rear of trailer.

(7) All ball valves in equipment room.

10.3 DISCONNECT ELECTRIC

a. Turn air conditioner and heater to OFF position at thermostat.

b. Move emergency lighting power toggle switch to the OFF position.

c. Turn OFF exterior lights.

d. Disconnect grounding connection.

10.4 OUTSIDE FIXTURES

a. Remove barrels, signs, benches, step pans and drop chutes and store in and under trailer. Lock all outside doors.

b. Remove folding steps and handrails and store under trailer.

c. Raise front and lower platforms and lock into place.

11.1 DOOR INTERLOCK SYSTEM

a. The exterior door (DOOR 1) interlock operates form the keyed switch as does the exterior for DOOR With the keyed switch in "OFF" position the interlock is inoperative.

b. The "Interlock" switch located in the Clothing Issue room disables the complete interlock system.

c. The "Interlock Override", (Red push button located on the exterior at the rear entry door or DOOR 1), disables the interlock for a period of 15 seconds to allow the entry of personnel into the trailer when it is in operation. **NOTE:** DOOR 2 must be closed for DOOR 1 to open.

d. The "Interlock Override", red push button on the interior of DOOR 1, in the Decon Wash Room, enables personnel to exit the room through Door 1.

e. The "Interlock Override", red push button in Auto Shower Room enables personnel to exit the room through Door 2 to the Decon Wash Room.

f. The opening of door 4 to the Respiratory Protective Equipment Down Dress Room (RPE) is controlled by the operator in the RPE Room. An "Interlock Override", red push button is located on the right side of Door 4 above the doorframe. This switch enables personnel to exit the Overgarment Down Dress Room and enter the RPE Room in case of emergency only.

g. The door control, (Red push button located to the left side of door 4), waist high, on the interior of the RPE enables the operator in the RPE to monitor entry of personnel from the Undergarment Down Dress Room.

NOTE: The door can only be opened when personnel have been processed and the operator opens the door.

h. The red push button referred to above may be used by personnel to exit the RPE and enter the Overgarment Down Dress Room. This procedure must be performed only in the case of emergency or when entering the work area through the trailer.

11.2 GENERATOR

a. A block heater cord is provided with the generator diesel engine. When trailer is connected to shore power the generator may be maintained in a standby condition, preheated, by use of the block heater. Use receptacle by breaker panel to connect block heater cord.

b. Cooling air louvered intake may be tested by switching the GIFC receptacle located to the left of louvered intake to the test and reset positions. Louvers should close and open to verify that thermostat and louver actuating motor are operable.

NOTE: Only qualified personnel will operate the Generator.

11.3 DECON SOLUTION PUMP

a. The Decon Solution Pump, (Located at the rear of the trailer), supplies solution to the decon brush. The pump takes decon solution from the decon solution tank to the brush. The tank is filled from the solution fill port at the street side, front of the trailer. A drum pump is used to fill the solution tank. Electrical power is supplied to the drum pump by the exterior receptacle located by the personnel entry door in the cold side of the trailer.

11.4 WATER PUMP

a. The primary or fresh water pump is located in the equipment room. The pump is a diaphragm pump and requires priming if system has been evacuated or drained. To prime pump open ball valve on top and pour water into the funnel top pipe. Close ball valve and turn on pump. If pump does not prime repeat until pump is primed. Once pump is primed, pump will hold prime unless pump is drained.

11.5 DROP CHUTES

a. Drops chutes are provided for disposal of protective garments and equipment. The Drop Chutes have a rubber bank at the outside for retention of plastic bags or plastic sleeves. Drops doors are to be closed when not in use. Drops are also to be sealed from the outside by the insertion of the slide doors and locked during periods of storage or non-operational status. All chutes are interchangeable and are stored under the floor of the trailer in areas so designated. One chute must be stored in the mechanical room.

11.6 AWNING

a. The awning is to be used for shade and weather protection. The awning may be deployed using the hand crank, which is stored in the Decon Solution Pump Box at the rear of the trailer. The crank receptacle is located on the left side facing the awning. Place crank handle hook into receptacle and turn crank, after three turns, the awning unlocks and unfolds out of its storage position. As awning is cranked out, the support legs can be released from the leading edge box and position as desired. The supporting legs are adjustable and should be extended to provide maximum headspace. Stakes are provided to solidify supporting legs.

11.7 HOSE BIB

a. A hose bib is provided at the rear of the trailer for use in wash down of equipment.

11.8 FLOOD LIGHTS

a. Three floodlights are positioned two at the rear of the trailer and one at the front street side corner. The lights are adjustable horizontally and vertically. In order to extend the light the knob must be loosened on the mast. Front light head must be lowered for transit and directed toward rear of trailer. Rear light heads must be lowered and directed toward the ground to prevent damage caused by flying road debris or trees.

11.9 UNDER BODY FLOOD LIGHTS

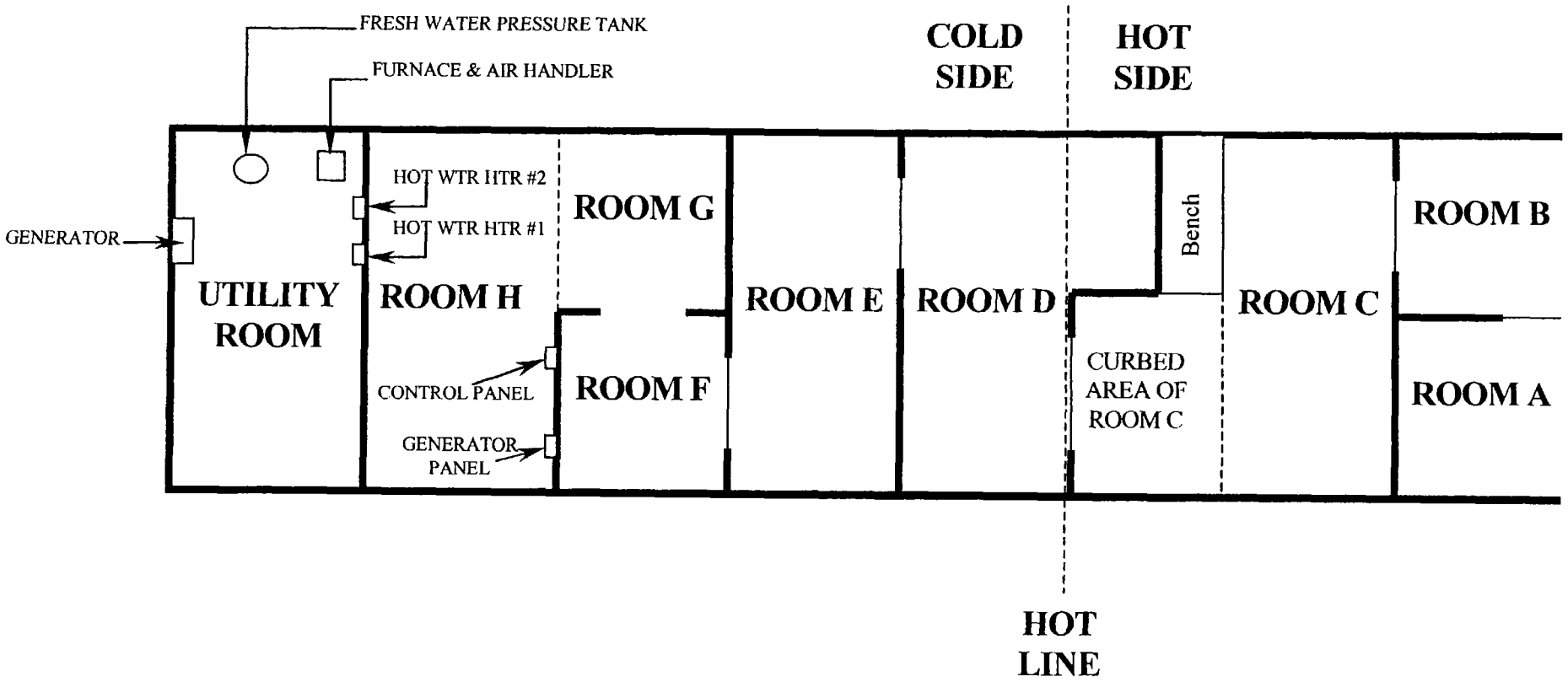
a. Floodlights have been installed under the body of the trailer, and are activated by the exterior light switch located in the clothing issue room. Lights may be adjusted for more efficient lighting of work area after set up.

11.10 MPDS LAYOUT (Next Page)

MOBILE PERSONNEL DECONTAMINATION SYSTEM (MPDS)
LAYOUT

ROOM A – DECON ROOM
ROOM B – AUTO WASH
ROOM C – OVERGARMENT DOWN DRESS
ROOM D – RESPIRATORY EQUIPMENT DOWN DRESS
ROOM E – UNDERGARMENT DOWN DRESS

ROOM F - DERMAL SHOWER
ROOM G - DRYING ROOM
ROOM H - CONTROL ROOM/SUPPLY ROOM
UTILITY ROOM - AKA EQUIPMENT ROOM



APPENDIX C

ENVIRONMENTAL CONSIDERATIONS

	SOLID	LIQUID	AIR
Type of material generated and amount (if known)	1) Rags, towels, gloves and other cleaning items; unusable PPE; sampling equipment. 2) Soil.	1) Decon liquids less than 1 gal. 2) Solvents/organics	N/A
RCRA hazardous/non-hazardous/agent contaminated determination (if RCRA hazardous, identify corrosive, TCLP, reactive, ignitable, or listed)	1) 3X Solid Waste (non-hazardous). **2) Soil will be managed as hazardous waste due to trace levels of arsenic or extreme pH levels.**	1) 3X Decon liquid (non-hazardous). 2) May carry D002 code for corrosivity, and therefore hazardous.	N/A
Ultimate disposal methods(describe in detail)	1&2) All materials will be double bagged and drummed (as compatible), monitored, and disposed of IAW local environmental regulations or APGR 200-60, (whichever is applicable).	1&2) All liquid wastes will be containerized, appropriately labeled, and disposed of IAW local environmental regulations or APGR 200-60, (whichever is applicable).	N/A
Spill control method	1&2) Any solid spill will be collected, containerized and disposed of IAW local environmental regulations or APGR 200-60, (whichever is applicable).	1&2) Caution will be used to minimize liquid spillage. Any liquid spilled will be immediately collected and containerized. Spill equipment will be used as necessary to contain spills, and will be disposed of IAW local environmental regulations or APGR 200-60, (whichever is applicable.)	N/A
Spill material disposal method	Same as above	Same as above	N/A